COMMERCIAL MOTOR TRANSPORT EXHIBITION—I

Enlarged Issue

MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

Special Articles

VOL. LXXXIV No. 2157 [Registered at the G.P.O. as a newspaper] LONDON, SEPTEMBER 17, 1960 PRICE ONE SHILLING

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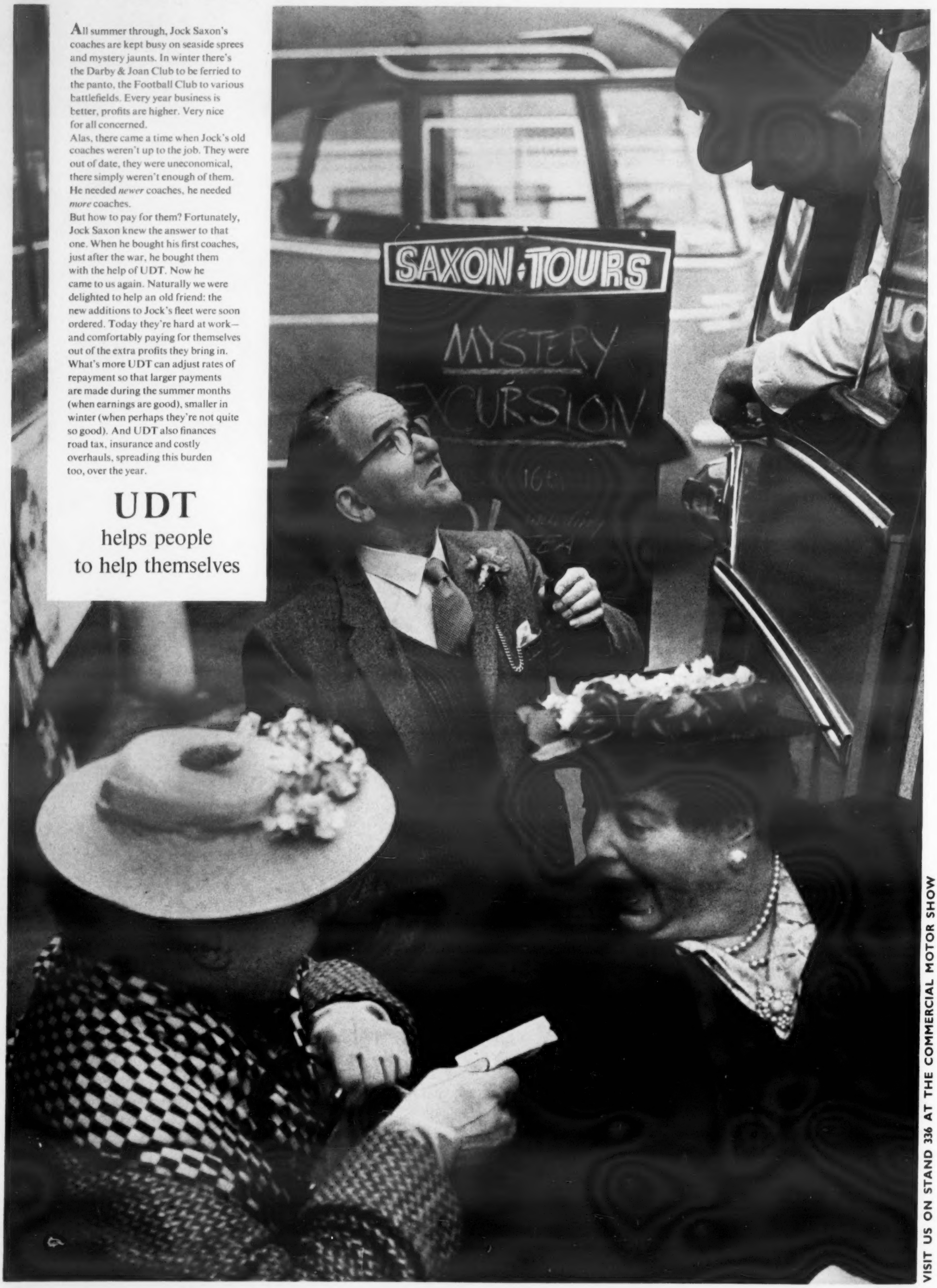

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ACCS

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MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

NOTABLE LOW-HEIGHT DOUBLE-DECK BUS

See Page 3

VOL. LXXXIV No. 2157 [*Registered at the G.P.O. as a newspaper*] LONDON, SEPTEMBER 17, 1960 PRICE ONE SHILLING

CURRENT TOPICS

Manchester—Crewe Revivified

GREMLINS and Fleet Street continue to harry British Railways. Several minor mishaps on the opening day of the Manchester—Crewe electrification prevented entirely smooth working owing to the small number of locomotives so far available, but affairs were hardly as disastrous as the daily press made it seem and, as an example, the train in which the Minister of Transport returned to London, although it left Manchester Piccadilly (the renamed London Road) 21 min. late, was actually before time on arrival at Euston, illustrating the recovery power of electric and diesel traction. Newspapers ignored this happier aspect and the high speeds of 95 and 102 m.p.h. reached in short distances on special trips. The electrification represents years of devoted work by British Railways and London Midland Region staff and the contractors; it is a new artery in and out of Manchester and can be the prelude to extension to London—an extension which it can be confidently predicted would not only give satisfaction to the users but would be handsomely profitable to the British Transport Commission. The British electrical industry has been able to show that a system originally developed elsewhere to use 50-cycle current from the national grid can be successfully adapted to British conditions and even developed on our own lines; all the multiple-unit trains have germanium rectifiers, for instance. On Monday the Minister of Transport, Mr. Ernest Marples, not only inaugurated the new service but was able to assure his hearers of the Government view that railways were essential and that they were going to be helped.

The Trades Union Congress

APART from pre-occupation with nuclear disarmament and surprising ingenuity in producing a two-way vote on the subject, this year's Trades Union Congress was an occasion for self-examination: not that the delving went very deep. In this respect Mr. Claude Bartlett's analytical presidential address—he is also president of the Confederation of Health Service Employees—would have been more instructive and illuminating had it not observed official policy by playing down the extent and significance of wildcat strikes. Internal dissensions are seriously affecting the movement and go far to explain why eight million trade unionists constitute only a third of the working population and why membership has not increased for seven years. These truths were stated by Mr. F. S. Winchester, of the National Union of Vehicle Builders, whose motion calling for examination of the steps necessary to secure greater participation by young people in union membership and activity was adopted. The presidential address also emphasised the need for attracting black- and white-coated workers, but perhaps the most trenchant speech on the subject came from Mr. W. Bernard, of the National Union of Bank Employees, who is incensed at the determination of the big banks, other than Barclays, to maintain their own staff associations. He asserted that there were tens of thousands of workers on whom the unions were not making the slightest impact. "Although we have a reputation for facing both ways," he remarked, "we may also have the unfortunate habit of burying our head in the sand." They might have 100 per cent membership on the shop floor but production techniques were creating an army of non-unionists in clerical, technical and scientific posts, he said. Is this yet another trend arising out of trade union bickering? If so it is doubtful whether the instruction to the general council to encourage non-manual workers' organisations will do much good.

Caution in Presidential Address

MUCH of the presidential address was concerned with internal union difficulties, upon which more concentration is certainly needed. Dealing with the burning question of unofficial strikes, Mr. Bartlett cautiously remarked that occasionally proper procedures were overlooked in the heat of an industrial argument and promises made in agreements were broken. Much worse, though much more rare, was the emergence—in some places sporadic, in others semi-permanent—of an organised conspiracy to defy union rules and to ignore agreements. The sensible trade unionist did not need a union within a union; he could not afford to have two trade union movements. "He does not relish becoming one of hundreds of trade unionists to be flung out of work and to have their earnings cut at a few hours' notice because a dozen men in another workshop have downed tools," said Mr. Bartlett. On the other hand, the conscientious majority must be equipped with all the knowledge they needed to cope confidently with the variety of questions that came their way. The pace of trade union education must be quickened and members must be kept up to date with the main features of union policy. Some people wanted a publicity campaign to restore the reputation which the unions were said to be in danger of losing, but the best publicists were trade unionists who spoke with assurance of what they knew. This view was endorsed during debate when delegates urged that in connection with disputes the unions, instead of decrying the Press, should use it as did the employers.

Unofficial Strikes

EVEN the mild suggestion in the general council's report on unofficial strikes and shop stewards (reviewed in our August 27 issue) that disciplinary action should be taken in some instances met with opposition, notably from Mr. Abe Moffat, of the Mineworkers' Union, and Mr. F. Haxell, Electrical Trades Union. Their views were strongly criticised by Mr. H. Douglass (Iron and Steel Trades Confederation), and congress agreed with Mr. Frank Cousins and Sir Tom Williamson, of the T.U.C. Executive, that this section of the report should be adopted. The latter believed that out of about 200,000 shop stewards only a handful misused their offices; a very small minority in the movement was anarchic and 99 per cent of the membership had abided by union rules. Nevertheless even since the report was completed there had been a meeting of stewards in a vital industry which took over the executive authority of five important unions. Such actions, he exclaimed, undermined the spirit and integrity of the movement; no wonder some trade unionists were tearing up their cards in disgust. Other points emerging from an interesting debate were appreciation of shop stewards—an indispensable body of men, said Mr. Carron (A.E.U.), unfairness of making a scapegoat of the Press, and a restatement of belief in the basic principles of public ownership—building was specifically mentioned. Adopted was a composite resolution, moved by Mr. S. Greene (N.U.R.), re-affirming support for an integrated transport system and opposing any attempt to separate the existing railway regions or to hive off any part of the industry. Perhaps it is an exaggeration, as one delegate suggested, that the T.U.C. is devoid of power, but there can be no escaping the truism that disunited leadership breeds weakness and disrespect. Of this Mr. George Woodcock, the newly-elected general secretary, must be well aware.

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New Atlantic Container Service

SUPPORTERS of road-sea container services will doubtless be interested to learn that the British firm of Davies, Turner and Co., Limited, has met with a great deal of success in the United States—United Kingdom cargo container service which it started last April in conjunction with North American Van Lines, Incorporated. The latter, in addition to depots at all principal American ports, has facilities in 1,400 cities throughout the U.S.; here Davies, Turner needs no introduction in the spheres of shipping, forwarding and warehousing. According to Mr. Urban Stephenson, managing director, the firm has had something of a struggle in persuading the North Atlantic Freight Conference to grant the containers a reasonable freight rate; container freight is assessed somewhat differently from parcel or bulk general cargo, being calculated on the outside measurements or maximum loaded weight of the approved container, whichever is applicable, and it is this which has made things difficult. However, it did manage to obtain first one concession of 10 per cent and then another of 5 per cent which brought the total to 15 per cent. But Mr. Stephenson points out that the Continental ports are working on a 30 per cent allowance for the same type of container, and determined pressure is being applied which will extend this allowance to Britain. It was his idea to introduce this service, and oddly enough it was those great protagonists of containers, the Americans, who were somewhat slow to make use of this particular one and, indeed, the American Customs has for long been a stumbling block. British manufacturers showed immediate interest, but return cargoes consisted mainly of goods and equipment for the United States military forces, well known as proponents of this mode of transport since the Korean War. American exporters are now showing much more attention, and in fact the service is carrying an increasing amount of all those types of cargo so familiar to container traffic, with one leading British motor manufacturer shipping spares in six containers a week.

In West Cumberland

ALL through the expansive days of the first part of the railway era agriculturists were anxious to have the iron road permeate every part of the country, so that no place where marketable crops were raised would be more than the three-mile cartage radius from a goods depot. Every farmer beyond the magic ring felt at a disadvantage. It soon became obvious that full-scale railways under the meticulous requirements of the Board of Trade could not fulfil the need economically—from this realisation stemmed the abortive Railway Construction Facilities Act, 1864, and the light railway legislation embodied in the Regulation of Railways Act, 1868. Although they were luckier in Ireland, nothing workable came on the statute book in Great Britain until the Light Railways Act of 1896. In the meantime, however, Sir Percival Heywood and others worked on the problem and at Duffield Bank, Derby, Sir Percival provided a cheap steam-operated railway system by descending to the 15-inch gauge. This was later proved at Eaton Hall, then the Cheshire seat of the Dukes of Westminster, where winter coal consumption was at the rate of 40 tons a week. No public railway on this gauge was seen until 1915 when the late W. J. Bassett-Lowke and some friends took over the derelict 3-ft. gauge Ravenglass and Eskdale Railway and reconstructed it with Duffield Bank equipment as well as Bassett-Lowke miniature locomotives. Regular all-the-year passenger traffic was developed in the days when buses did not penetrate the narrow dales of West Cumberland and ordinary motor cars were unable to tackle the 1 in 3 of Hard Knott Pass. The vanished hæmatite ore traffic which had been the reason for the original line was replaced by roadstone traffic, later moved from the crushing plant to the main line in standard-gauge wagons. The narrow-gauge survives, but only as a summer attraction; the owner, the Keswick Granite Company, put the property up for auction last week. A happy consummation is that it has been purchased for £12,000 by a preservation society and will presumably now give pleasure in its journeys up to Dalegarth for many years to come. The Ravenglass and Eskdale was used to experiment with Poultney valve events on steam locomotives. One engine, the 0-8-2 *River Irt*, incorporates Heywood wheels and motion built for his 0-8-0 tank *Muriel* in 1894. We welcome the new chapter in its affairs.

Another Launching at Cowes

AN unusual working by the Southern Region on September 6 was the provision of one of the *Brighton Belle* Pullman electric sets to convey guests between Waterloo and Portsmouth in conjunction with the launching of the British Railways vessel *Sarnia*. This ship, which is being built by J. Samuel White and Co., Limited, at East Cowes, is due for delivery next spring and is a sister ship to *Caesarea*, which was launched in January of this year and described in our issue of February 6. These two ships are intended for the remodelled services to the Channel Islands due to commence as from May, 1961, and will be the largest ever used on these routes and the biggest vessels that can be handled at St. Helier. Apart from effecting a considerable economy over the smaller ships that now operate these services they will eliminate the present discomfort of overcrowding during the holiday season. To this end they have been designed for one class with a uniform standard of comfort throughout and accommodation for 1,400 passengers. *Sarnia*, appropriately named after the old Roman appellation for the island of Guernsey, was successfully launched by Mrs. W. H. Arnold, wife of the Bailiff of Guernsey, in the presence of Sir Philip Warter, chairman of the Southern Area Board, and Sir James A. Milne, C.B.E., chairman of the shipbuilder. The latter, in his address, likened the launching of a ship to a metamorphosis, for although it might appear to be nothing more than the lowering of a given mass through a given distance, it was in fact at that moment that the ship took life.

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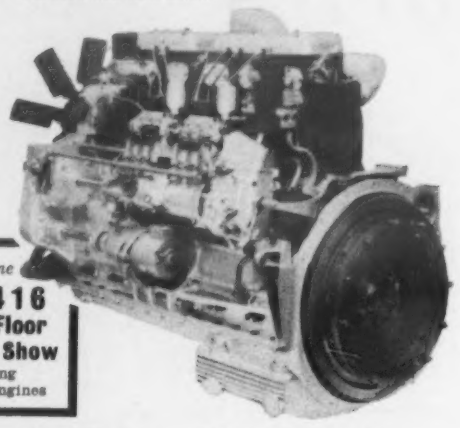

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MODERN TRANSPORT

Published Every Friday
RUSSELL COURT, 3-16 WOBURN PLACE, LONDON, W.C.1

Telephone Number: TERminus 0303 (3 lines)
Telegraphic Address: Transpubco, Westcent, London

ANNUAL SUBSCRIPTIONS
BRITISH ISLES, 47/6; CANADA, 45/-;
ELSEWHERE ABROAD, 47/6
payable in advance and postage free

The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

Novelty at Earls Court

NEXT Friday brings the opening at Earls Court of yet another International Commercial Motor Transport Exhibition, the 20th in the series, with a ceremony to be performed by Mr. Ernest Marples, Minister of Transport. In our last two issues we have carried descriptions of new vehicles for introduction at the show by roundly half-a-dozen British manufacturers; this week there is news from several more and details of other interesting new products are due for release coincident with their arrival at the exhibition. The pattern that seems to be emerging from these several pronouncements is of consolidation of tried and tested designs for the run of general-purpose goods and passenger vehicles, with innovation only where such has been extensively proved to provide some positive technical or operating advantage. There is nonetheless innovation in plenty to be found, much of it indicating the very close attention paid by designers and manufacturers to some of the more pressing needs of the world's operators efficiently to meet the stiffening conditions of modern road transport. Thus we shall see a new A.E.C. Regal VI heavy-duty passenger chassis laid down along the familiar lines of that outstandingly successful medium-weight vehicle—the Reliance—though embodying all new units; the new Dennis Vendor delivery vehicle, with front drive and simple and sturdy independent suspension for great freedom of low-loading body design and easy mobility in congested streets; a pair of new Scammell matched articulated outfits, one with Gardner horizontal diesel engine mounted low down behind the cab and both with multi-wheel bogies of advanced design for improved stability and braking; a new tipper or dumper chassis for heavy off-road service and a range of diesel engines of higher power from Thornycroft; a new rear-engined double-deck bus from Daimler and Metropolitan-Cammell-Weymann that fits 78 conventionally laid out seats into an overall height of only 13 ft. 4 in.; and various other evidences of steady progress.

Higher Engine Powers

VERY much in evidence at the exhibition will be the new range of Leyland heavy-duty vehicles—still retaining the names Beaver, Hippo and Octopus that have become almost household words in so many countries of the world. Major changes in this famous range are the new Power-Plus diesel engines giving substantially greater specific power and economy than their earlier counterparts, new wide-range transmissions, improved non-reactive suspension for the multi-wheelers and improvements in driver wellbeing. The greater output of the new engines has been obtained without recourse to pressure charging or other complication and derives solely from refinement of breathing passages and fuel injection and combustion characteristics. Far from having been jeopardised, the traditional long life of Leyland diesel engines has been enhanced in the new design. Sir Henry Spurrier, Leyland chairman and managing director, who has taken a personal part in the design of the new vehicles and engines, told us recently that where 200,000 to 300,000 miles between overhauls was now common, figures between half a million and two million miles appeared as a possibility for the future. Commenting on the absence of such features as air suspension and disc brakes in the new vehicle range, Sir Henry said that 10 years was the minimum period required for introduction of major changes such as these involved; such features might start to appear in the currency of the new range, but were not yet ready for ordinary production goods vehicles. The new Leylands, he said, introduced a new sphere of power output and economy which would be found as satisfactory overseas as at home and they had a potential of progressive development that would meet requirements over the next 10 to 15 years.

Air Suspension and Disc Brakes

ON the other hand, the Leyland Group is as advanced as any manufacturer in adopting new ideas, once proved, in situations where positive benefit accrues. Evidence is found in the new rear-engined Lion single-deck passenger chassis developed for export, which is offered with fully automatic transmission and pneumatic front suspension; in the new Scammell semi-trailer bogies, which use solid rubber or air suspension; and in a new eight-wheeled integrally constructed tanker developed by Thompson Brothers (Bilston) and Leyland Motors for British Petroleum Company, which has a rear-mounted engine and air suspension all round. Several other semi-trailer builders and operators have decided that air is the right medium for the suspension of vehicles having a wide difference between empty and loaded weight, as a number of exhibits at Earls Court will show, while at least one example of the application of disc brakes to a semi-trailer will be shown. Guy Motors is alone so far among the commercial passenger vehicle manufacturers in taking a double-deck bus through to the production stage with both disc brakes and air suspension all round, as evidenced in the recently introduced Wulfrunian; the Wolverhampton firm is supported by orders for the chassis from several operators. Air suspension for the big buses is now gaining more general acceptance and is available at the platform end (for its constant-height irrespective of load characteristic) on A.E.C. Bridgemaster and Leyland Atlantean and at the rear of the Dennis Loline. The Loline is of course the licence-built Bristol—E.C.W. Lodekka, which itself created a furore when it was introduced as an outstanding low-height design, though it was not permitted public exhibition at Earls Court since Bristol does not manufacture for general sale. Some might think this rule a pity for, although it did not bar London Transport's notable integral RM design, this being manufactured by normal commercial concerns, it does keep out not only Tilling group vehicles but those remarkably forward-looking passenger vehicles designed and built by the Birmingham and Midland Motor Omnibus Company for its own use. This company's integral designs, introduced six years ago for single-deckers, of which some 300 are in service, and since adopted also for production double-deckers, including the remarkable 80-seat underfloor-engined D10 just introduced, are worthy of the widest appreciation, while the design of rubber suspension used appears worthy of much wider application.

Logical Forward Control

SIGNIFICANTLY, having had entirely satisfactory service from the disc brakes fitted at both front and rear axles and in the transmission of its single-deckers, after trying discs all round on a prototype double-decker, B.M.M.O. has reverted to drum brakes at the back of its production D9s and prototype D10, though retaining discs at the front in both cases. While the implications of this should not be overrated, it does perhaps indicate that further development remains to be done before we are likely to see large-scale replacement of drum brakes by discs on vehicles above about 10 tons gross. Support for the disc brake in a role in which it does possibly offer immediate advantages comes from Vauxhall Motors in the new Bedford TK range, which incorporates such a unit as a hand transmission brake on the heavier vehicles. The TK range is, however, notable for another reason; it represents a bold and, we think, successful attack on the inadequacies or disadvantages of the forward-control configuration while retaining all the advantages and achieving quite exceptional good looks. Also making a first appearance are the recently introduced B.M.C. small vans. Visitors who have not yet made their acquaintance should certainly not miss this opportunity of doing so, for they represent a bold and ingenious breakaway from orthodoxy that secures a number of advantages for operators of this class of vehicle, not the least of which is extreme economy of operation and maintenance. But apart from all these more readily apparent novelties due to appear at the exhibition, there will be the usual wealth of less obvious but still important developments worth seeking out on vehicle and component manufacturers' stands. These are the stuff of which the continuing prosperity of our great commercial vehicle industry is made and what makes this biennial Earls Court event what it is—technically the most interesting and instructive show in the international motor exhibition calendar.

NEWS SUMMARY

STEAM trains were withdrawn from the Chesham branch of the London Transport Metropolitan Line after September 11. All Chesham trains, except for one service operated by the L.M. Region, are now electrically operated and some electric trains between London and Rickmansworth have worked to and from Amersham since September 12. A reception to mark the cessation of steam traction was held at the Chesham Urban District Council offices on the evening of September 10.

Doubts as to the economic desirability of early introduction of supersonic transport aircraft were expressed by Sir William P. Hildred, director-general of I.A.T.A., in his report to its annual general meeting. (Page 9.)

Two Albion chassis have been re-engined and a third has been given a five-speed gearbox. (Page 14.)

A new rear-engined Daimler double-decker, the Fleetline, can accommodate 78 passengers in a low height body. (Page 3.)

The Minister of Transport inaugurated the Manchester—Crewe railway electrification by waving off the 12.15 p.m. from No. 5 platform of Manchester Piccadilly, formerly London Road.

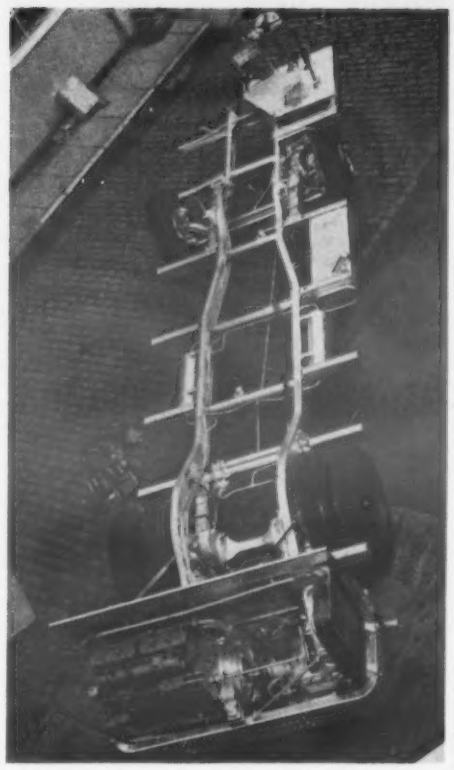
Work began on September 12 on reconstruction, to 10-ft. width, of the grassed hard shoulders of the M1 motorway north of Luton.

DAIMLER FLEETLINE

Rear-Engined Double-Decker

M.C.W. 78-SEAT LOW-HEIGHT BODY

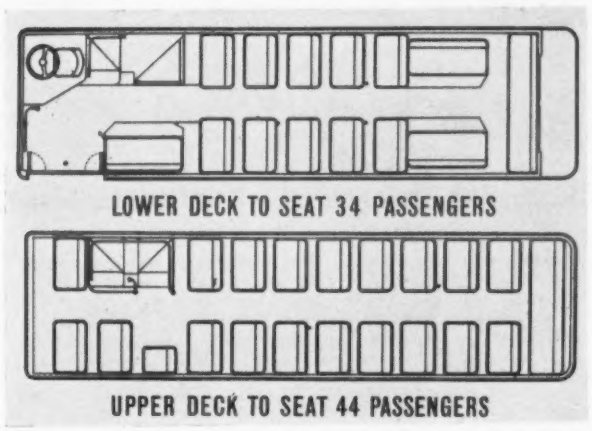
SEATING capacity of 78 in conventional straight central-gangway layout, flat floors on both decks and a wide flat low-height platform forward of the front wheels, all in a low overall height of 13 ft. 4 in. suitable for operation on routes with low bridges, have been achieved in a new rear-engined double-deck bus design to be introduced at Earls Court next week by Transport Vehicles (Daimler), Limited. Named Daimler Fleetline, the new vehicle will be on show in both chassis form and fitted with a Metropolitan-Cammell-Weymann 78-seat body. The exhibit is likely to create great interest for being the first production double-decker offering 78-seat capacity in 30 ft. by 8 ft. dimensions within generally accepted low-bridge height. The Fleetline is available also with left-hand control and right-hand entrance for export, while a long-wheelbase single-deck version to take bodies up to 36 ft. long is under development.



Details of the Fleetline layout are shown clearly in this picture

General Description

The Daimler Fleetline chassis has a wheelbase of 16 ft. 3 in. and is designed for a low front-entrance single-step double-deck bus with driver-controlled platform doors. Seating capacity is 78 within the overall dimensions of 30 ft. long by 8 ft. wide by 13 ft. 4 in. high. A drop-centre double-reduction rear axle and drop-centre front-axle beam permit an extremely low floor and gangway on the lower deck. A centre gangway is used in both upper and lower decks. A detachable subframe mounted at the rear contains the engine, fluid flywheel, gearbox, right-angle drive, radiator and fan. The chassis is fitted with the Daimatic electro-pneumatic gearbox, giving two-pedal control, and high-efficiency air brakes with automatic adjusters.



Conventional seating layout and flat floors have been achieved on both decks

Both show vehicles are fitted with the Daimler CD6 Mark VIII diesel engine, which develops 125 b.h.p. at 2,000 r.p.m., but this is an interim arrangement only.

The standard engine is the efficient Gardner 6LX diesel, which is mounted transversely at the rear. This six-cylinder four-stroke direct-injection vertical unit, with a bore of 4.75 in., stroke of 6 in. and displacement of 10.45 litres, gives a maximum of 150 b.h.p. at 1,700 r.p.m. and maximum torque of 485 lb./ft. at 1,050 r.p.m. The engine drives through a direct-mounted fluid flywheel and rubber-bushed trailing-link coupling to a four-speed Daimatic electropneumatically operated compound epicyclic gearbox, which can be equipped with automatic or semi-automatic control. The trailing-link coupling permits the units to be independently mounted in the subframe. Gearbox ratios are 4.15, 2.35, 1.56 and 1 to 1 forward and 4.87 to 1 reverse. Mounted integrally with the gearbox, but having its own lubrication system is an angle drive, comprising spiral-bevel gears, to carry the drive through a short open propeller shaft to the rear axle.

A cast-aluminium radiator is flexibly mounted above the gearbox and has a 22-in. fan running in a special type of cowl. The cooling system is pressurised to 4 p.s.i. and connections are provided for saloon heater pipes. The complete self-contained power pack is carried on a large pressing forming a subframe, which is bolted at the rear end of the chassis and is easily detachable. Individual engine and transmission units on the subframe can also be removed separately without disturbing the subframe. The rearmost flange of the subframe has increased depth to form a stout bumper, to guard against rear end damage. The engine accelerator control is hydraulically operated.

The two main frame sidemembers are channel section pressings $\frac{5}{16}$ in. thick with 3 in. flanges and maximum web height of $9\frac{3}{4}$ in. Six flanged tubular crossmembers are secured by fitted bolts. Substantial outrigger brackets are fitted with flanged ends for easy body attachment. The frame design allows either right- or left-hand drive to be supplied. The front axle is an H-section steel stamping with chromium-plated swivel pins. Anti-friction material is used for the swivel axle bushes and also to take the swivel pin end thrust. The wheel hubs are mounted on two opposed tapered roller bearings which can be adjusted by a vernier locknut.

The double-reduction drop-centre driving axle has a first stage by spiral-bevel pinion and wheel positioned to the right-hand side of the chassis; it drives through a large four-pinion differential unit. The second stage is by straight spur gears mounted on lipped roller bearings. Four different ratios available in the angle drive give overall ratios of 6.03, 5.75, 5.06 or 4.61 to 1, while further variations are possible by changing the axle ratio.

The Daimler Fleetline rear-engined double-decker takes 78 seats in conventional layout in 13 ft. 4 in. overall height

Brakes, Suspension and Steering

Bendix-Westinghouse air-pressure braking system is fed by 10-cu. ft. compressor, with separate reservoirs for brakes and auxiliaries. Actuation is by diaphragm and automatic adjusters are fitted. Total friction area is 733 sq. in. Semi-elliptic inverted-camber silico-manganese leaf springs are fitted all round. They are all 4 in. wide, dual rate at the front, constant rate at the rear. Case-hardenend chromium-plated interchangeable shackle pins can be rotated for increased life. Telescopic dampers are fitted at the rear and lever-type units at the front.

Marles cam-and-double roller steering gear operates a two-piece drag line supported midway by a relay lever. The gear ratio is 28.5, resulting in $5\frac{1}{4}$ turns of the 21 in. steering wheel. Swept

(*Continued on page 6*)

Photograph by courtesy of Drew Bros. (Frampton Cotterell) Ltd.

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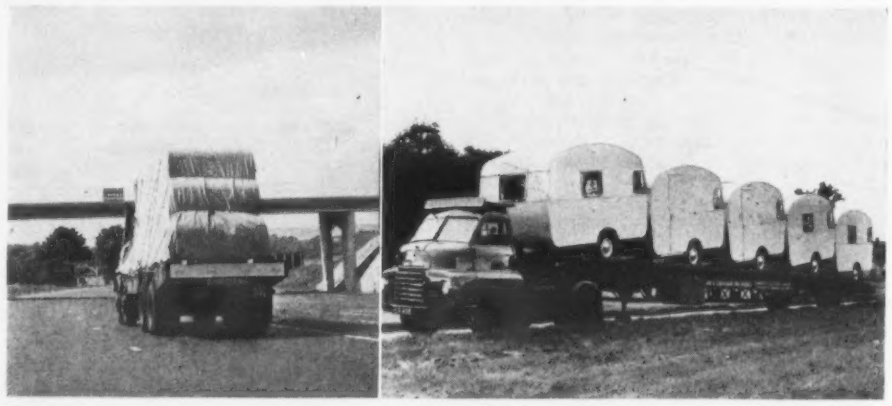
LORRY—BUS—COACH

Minister Queries Return on Bus Capital

BECAUSE, he says, the South Wales Area Traffic Commissioners did not establish that new fares scales authorised to the South Wales Transport Co., Limited, and the Western Welsh Omnibus Co., Limited, were reasonable, and in particular that the rate of return on capital was not too high, the Minister of Transport has ordered the Commissioners to reopen the case for higher fares. Actually the fare scales subject of the appeals (by local authorities) have been superseded by new ones and it is these which will be examined in the light of any additional evidence which may be forthcoming.

It appears to the Minister that the evidence adduced by the companies about the level of return of capital employed in the general run of commercial undertakings did not demonstrate the reasonableness of the returns claimed. Commercial undertakings generally comprise concerns operating in widely different circumstances with widely varying degrees of risk, and the rates of return on capital vary similarly. While it is true that the rates of return claimed by the applicant companies were substantially lower than the average commercial figure shown in their applications, no evidence was put forward to show that the difference represented an accurate assessment of the differences in risk and other features between the circumstances of the applicant companies and those of commercial concerns generally. In the Minister's view, the comparison was altogether too general in character to justify the conclusion that the rates of return claimed were not unreasonable.

The Minister adds that his decision does not imply that he regards increases in the rates of return of bus companies as being unacceptable. He considers, however, in this instance that the applicants failed satisfactorily to demonstrate that the returns claimed and the increased fares thus called for would not be unreasonable. The appellants also attacked the companies' calculations of return on capital on the ground that they were based on inflated capital values. On this point the Minister agrees with the inspector that, in relation to these appea's, no valid criticism can be made either generally of the capital structure of the companies, which has been expanded only to a reasonable extent to take account of increasing costs of replacement, or, in particular, of the South Wales Transport Company's use of liquid reserves to purchase the Mumbles Railway and so free itself from burdensome obligations.



This Bowater eight-wheeler has its load of newsprint protected by an experimental Gourock Ropework sheet comprising a nylon core with cotton sheath. The Bedford articulated caravan carrier (right) boasts a 50-ft. Boden semi-trailer. The operator states that it is intended to carry caravans over 22 ft. long, which it is illegal to tow in the normal way

Manchester Computer

AN estimated £14,000 a year in administrative costs will be saved by Manchester Corporation Transport Department when a £40,000 electronic computer, now being installed in the corporation's treasurer's department, takes over the computation of the transport undertaking's payroll, involving 7,000 employees. There will be no dismissals of staff.

Birmingham Terminus Move

AFTER an existence of 74 years, Martineau Street, Birmingham, will be closed on October 16. For 54 years its south-west side has been the city terminus, firstly for trams and lately for buses, to Witton and Washwood Heath. A shop and office block is being built across the site. The bus terminus is being transferred to the recently-widened Union Street in which the flow of one-way traffic is to be reversed. Included in the plans for the new block is provision for a goods subway along the old line of Martineau Street.

Short-Sighted Shopkeepers

NEWS that a bus station is to be built in Wilmslow in the future is claimed by shopkeepers in Church Street to have caused a 40 per cent decrease in their trade. Now they are to protest to the Chamber of Trade about a no-waiting order which they say has driven shoppers from the town. They ask the council to delay introduction of the order until the bus station has actually been constructed. A Wilmslow council official commented: "The station will provide increased trade for the shops."

Experimental One-Man Buses for L.T.E.

ONE of three new one-man-operated buses which have just been delivered to London Transport and are to go into service shortly on routes 322 and 322A between Watford and Hemel Hempstead is illustrated on page 23. The Willowbrook bodies have separate front entrances and centre exits, both with power-operated doors under the control of the driver. As we indicated when the order was announced, it is an experiment to see whether the separate exit speeds up passenger movement into and out of the vehicle at stops. The new buses, to be known as the RW type, are on A.E.C. Reliance chassis and are 30 ft. long and 8 ft. wide with 16 ft. 4 in wheelbase. The bodywork, virtually of the standard Willowbrook metal-framed design, which is in service with Grimsby—Cleethorpes Transport, is of lightweight construction. It incorporates high-level windows above the cantrail on each side for the convenience of standing passengers. Each bus has seats for 42 passengers, 39 on transverse seats and three on a longitudinal seat on the near side immediately to the rear of the central exit. Externally, the buses are finished in London Transport's standard green Country Bus livery, except that the cream surrounds to the windows and windscreen have been omitted, relief being given by a cream band round the vehicle at waist level.

Ceylon Tenders Pared

THE Ceylon Transport Board will buy only about 150 of the 480 buses which it originally intended to buy this year. The Board does not have sufficient funds to buy all the buses originally planned. The full tenders for 480 buses were worth over Rs 10,000,000. They ranged from category A, large buses for the city, to category F, light vehicles for roads in the provinces. Of the E and F buses the Board wants all it has asked for. It will cut down on the bigger buses. A Commission of Inquiry is definitely to be appointed to investigate the working of the Board. The Minister of Labour and Nationalised Services, Mr. C. Wijesinghe, said he was now selecting the personnel who will serve on the Commission. Two of the commissioners may be recruited from abroad. All the commissioners will be persons with experience and knowledge of an undertaking of this kind, the Minister said.

Municipal Bus Results

Nottingham.—Net surplus was £10,749 (£3,723) after all charges. The decline in traffic, about 2 per cent per annum, appears to have been arrested to some extent.

Leicester.—The net surplus last year, £102,380 (£92,219), was the highest in history of the undertaking. Passengers carried showed a very slight decline, the rate of decline having slowed down. The fare scale still provides 0.83 miles for 2d. and 1.61 miles for 3d. (Leicester is, of course, a compact city). Of the £24,798 available after appropriations £10,736 is going to reserve.

Clearing Way for Goods Vehicles

ON and after Monday next, September 19, only goods vehicles (excluding dual-purpose vehicles) will be permitted to load or unload in the areas of the Mayfair, Westminster and Marylebone parking meter schemes in the West End, under Regulations made by the Commissioner of Police of the Metropolis with the consent of the Minister of Transport. This is an experimental scheme of traffic control for an initial period of four months coincident with the introduction of "on-the-spot" fines for certain traffic offences. The streets affected are in an area bounded by and including Piccadilly, Hamilton Place, Park Lane, Edgware Road, George Street, Marylebone Lane, Oxford Street and Regent Street and the experimental restrictions will be in force from 8.30 a.m to 6.30 p.m. on Mondays to Fridays and from 8.30 a.m. to 1.30 p.m. on Saturdays. Drivers of private cars and dual-purpose vehicles wishing to load or unload in this area must do so on a parking place, i.e., a meter bay or unloading bay, where waiting for this purpose is limited to 20 min. and is free of charge.

The "ticket" system was to have begun in these three zones only on Thursday this week, but its operation was subsequently postponed until Monday next as the new traffic wardens do not take up their duties until that day. Tickets will be issued for leaving a vehicle on the road at night without lights or reflectors, for parking, waiting with, loading or unloading a vehicle in a forbidden place, and for failing to pay street parking meter charges. These are what are termed "self-proven" offences and tickets will not be issued, at least at this stage, for causing an obstruction, an offence which may be arguable. The area will probably be extended to St. James's when the parking meter scheme there comes into force in November.

London Transport Modifies Bonus Proposals

WHEN officers of London Transport met the busmen's negotiating committee of the Transport and General Workers Union on September 13 it put forward certain revisions of the proposed bonus scheme rejected some months ago by a delegate conference of London busmen, despite acceptance by the committee. Under the revised proposals Central bus drivers would receive 10s. 6d. weekly and conductors 9s. 6d. weekly for the first 12 weeks while Country busmen would receive 9s. Thereafter the payment would fluctuate in accordance with revenue. The long service bonus of 1s. a week for drivers for every five accident-free years and 6d. weekly for conductors would be doubled and duties commencing after 10 p.m. would rate extra payment. The negotiating committee was to consider on September 15 what recommendations it should make to a delegate conference called for September 19.

Bus and Coach Developments

Cox's Coaches (R. D. Cox), Bilston, applies for a Walsall—Birmingham works express service of A. C. Thompson.

Birmingham and Midland Motor Omnibus Co., Limited, and Leicester City Transport propose joint operation of services to Eyres Monsell and to Hillsborough Road.

SERVICING AND MAINTENANCE OF MOTOR BUSES

Improving on the Standard

*By E. V. DYSON, General Manager, Huddersfield Corporation Transport Department**

THAT public service vehicles are well maintained and reliable is very evident when one studies the incidence of lost mileage due to vehicle defects. From sample figures taken over 12 transport undertakings of varying size, and operating under widely differing conditions, it is found that the average figure of mileage lost, attributable to vehicle defects, is only in the order of 0.01 per cent. An excellent testimonial, surely, to the vehicle's reliability, to the maintenance organisation and personnel of the passenger transport industry. The object of this paper is to discuss present-day methods of supplying the day-to-day needs of the motor bus and to investigate modern methods of all facets of maintenance and servicing, and whether these methods can be improved.

Cost of Garage Heating

Garaging in the open air is not a practical proposition in most parts of this country; the effect on the health and morale of cleaning staffs and on the condition of vehicle bodies cannot be good. Heating of covered garage space can prove very unsatisfactory and wasteful unless carefully planned and installed. Garages are notorious in their inability to maintain an even temperature. The following is a comparison of the cost of various fuels for a season:

	£
Coal, 110s. per ton	2,257
Coal, 85s. per ton	1,505
Oil, 35 seconds	3,493
Oil, 200 seconds	2,830
Oil, 950 seconds	2,508
Oil, 3,500 seconds	2,410
Coke, hand fired	4,299
Coke, auto fired	3,117
Electricity	6,556
Gas	5,947

If labour cost is added the order of cheapness would probably change to oil, coal, coke, gas and electricity. New systems, i.e., small unit space heaters and underfloor heating are well worthy of serious consideration.

Fuel Metering Systems

In comparing the two methods of fuel delivery to the vehicle tank from the point of view of metering, there seems to be no doubt that the more simple flowmeter, as used with above-ground storage, is the more reliable. It is comparatively simple in construction, with little in its make-up to go wrong and is not dependent on an outside source of power supply, as is the pump type metering equipment, and as a consequence, not as costly. For present-day above-ground installations, a head of fuel of not more than 12-14 ft. is recommended, which, if coupled with a maximum diameter delivery hose and filling nozzle, will result in quick dispensing without the high velocity which causes frothing in the fuel tank and serious overspills and under filling. It is suggested that manufacturers might well look to making available even larger diameter dispensing equipment and wider vehicle tank apertures, in order that speed of fuel delivery may depend upon bulk rather than velocity. To eliminate spillage, the practice of tanker refuelling, in which fuel is injected into the underside of the tanker, might be studied.

The vertical rotary type of washing machine appears to be the most efficient and economical method of cleaning buses. It is interesting to speculate upon possibilities of a buffing or polishing machine being made available to the industry; a machine which would be available for drying and polishing a vehicle immediately after passing through the washer.

Vacuum Cleaning

Of all the processes of servicing motorbuses, those of interior and exterior cleaning—as distinct from washing—have proved the most difficult to mechanise. Most undertakings in the country are still using the same basic methods as those practised 25 to 30 years ago. One wonders whether some form of buffing and polishing machine might not have partial success in this way, in satisfactorily cleaning the vehicle exterior. It is understood that the recent experiments in the use of a hand machine tool for leathering and polishing windows have achieved satisfactory results. From this small beginning, surely the next step could well be bigger machines. While for the cleaning of seat cushions and seat backs, the small hand vacuum cleaner has been an undoubted boon, the large type vacuum plant or suction cleaner has not by any means proved at all satisfactory. Its unwieldy, heavy trunking, which has to be pulled through windows or doors, or dragged up the stairs on to an upper deck, has in itself proved a deterrent to any success this method might have achieved. Would the insertion of permanent hosing or trunking in the bodywork of a vehicle, with suitable tappings for main and secondary hoses, be a practical proposition?

The modern inspection pit is a very far cry from its primitive counterpart originally built in the early part of the century for servicing tramcars. Today, the inspection pit, to really justify its existence—for it is a parasite, in that it battens on garage parking space during its off-duty hours—should be completely equipped with all essential equipment and arrangements made so that full use of it, day and night, may be made. The very essence of this underfloor work, which, however well organised, cannot be the most attractive of jobs, should be that all equipment is available in the inspection pit, in order to reduce fetching and carrying to an absolute minimum.

Oiling and Greasing

An automatic engine topping-up device is available which seems to be having some measure of success in economically taking over what was a very unsatisfactory job. The unit is simple in design and consists of a header tank fitted to the chassis or body, as near as possible to the engine and at a position easily visible for inspection. Incorporated in the header tank is a sight glass, so that the oil level can be easily seen and from the bottom of the tank the oil is piped by gravity through a float chamber, in which is incorporated a float valve, and on to the engine sump itself.

As the level of the oil drops in the engine sump, so does the oil level in the float chamber, with the result that the float valve is opened, allowing oil to flow into the chamber and thence to engine sump, until the two levels are raised sufficiently to close the valve by an upward movement of the float and thus shut off the oil supply. Experience of this unit has shown that it eliminates the costly process of nightly oil topping; it ensures that only the exact amount of oil which is necessary is kept in the sump. As the header tank is very accessible, oil can be pumped directly into the tank, thereby avoiding waste and ingress of dirt and finally, because over-filling of engine sumps cannot take place, as with the old method, improved engine oil consumption is a direct result of the use of this equipment.

Maintenance Periods

That certain operators have departed from accepted and orthodox practice of maintenance is very evident from the information given by operators of the frequency at which units are maintained. Injectors, fuel pumps, engines, gearboxes, are examples of units which received widely differing treatments. Undertaking A will swear that it is necessary to calibrate fuel pumps at every 5,000 miles and to repiston an engine at the completion of every 100,000 miles, while undertaking B will vow that this work is not necessary before the completion of 150,000 miles and 300,000 miles respectively.

Tests were commenced by a certain undertaking over 10 years ago upon 20 new double-deck buses, advantage being taken to use the then comparatively new heavy-duty lubricating oil as an engine lubricant. It was decided at the same time that emphasis in maintenance on these vehicles would be concentrated on frequent, regular and more intensified inspections, checkings and adjustments than had been the practice in the past. Because of its importance in the scheme of things, the power-unit inspection received special attention. It was felt that concentration on the frequent inspections of this nature, coupled with regular engine oil changes, using good-quality oil, would reduce the number of more major docks at higher mileages.

After the first vehicle had completed 130,000 miles, expectations of this were fully justified, for at that mileage and solely for the purpose of information, the gearbox and the engine cylinder heads were dismantled, in order to ascertain the condition. There was little or no wear on engine valves and valve gear and no wear on transmission gears. Encouraged by this information, the tests were proceeded with and continued on the basic lines originally laid down.

At the 300,000 Mark

Of the original 20 vehicles most survived to complete 300,000 miles without requiring any major attenfion whatsoever (the others fell out of the programme after extraneous mishaps). By then interest was focused chiefly on the power unit and when the first engine had completed 300,000 miles without having had either cylinder heads or sump removed during the whole of its life, it was decided to call in the engine manufacturers for a joint examination of valve gear, pistons, cylinders and crankshaft, in order to assess first the general condition of the engine and, secondly, what further potential life the unit might have.

From the subsequent visual examination, when the cylinder heads and sump of the engine were stripped, very little wear was observed and it was felt that the engine could be put back into service and a further 50,000 miles operation expected.

Again, it appeared that having proceeded so far with the examination, it would be wrong not to make a thorough check of all engine parts, in order to establish the exact state of the engine and its potential life. It was finally agreed that the operator should reassemble the engine and send it to the manufacturers for the purpose of bench tests for torque and power performances and a complete strip, with the object of ascertaining correct wear and make fatigue tests on all parts. This exhaustive test applied by the manufacturers showed remarkably small wear, considering the high mileage.

Average cylinder bore wear:	
Longitudinal axis	0·0047 in.
Transverse axis	0·0084 in.
Average crankshaft wear:	
Main bearing journal diameters ..	0·0013 in.
Big end journal diameters	Nil
Main bearing diameters	0·0029 in.

Crankshafts Carried On

It is interesting to note that the reassembled engine was returned into service with new pistons, piston rings and cylinder liners, but with the original crankshaft. An assessment was made at the time that had the engine remained undisturbed, it would have completed at least 350,000 miles in service. That this assessment was only conservative has since been proved by the fact that all the remaining vehicles have passed this mileage figure and, in one case, the engine has during this year completed 400,000 miles without the original assembly having been disturbed.

Now what does all this mileage mean in terms of time? In the undertaking in question, 400,000 miles represents over 10 years' operation, which, in turn, means that with modern units, equipment and ancillary commodities, coupled with a maintenance system adjusted to suit these modern conditions, power units need only one major overhaul and no minor overhauls during the whole of a vehicle's life of up to 20 years. The adjusted maintenance methods which were applied during these prolonged tests were, as has been previously mentioned, chiefly concentrated on frequent and intensified checks and adjustments as follows:

Nightly:
Engine sump topped if necessary.

Every 2,500 miles:
General vehicle inspection with particular attention to engine, transmission, suspension brakes and steering. Emphasis on the power unit was directed in particular to fuel and lubricating oil pipes and points, control linkages, cooling system and recording of oil pressure when engine was hot.

Every 5,000 miles:
As at 2,500 miles plus engine oil change.

Every 10,000 miles:
As at 5,000 miles plus injectors changed, fuel and air filters cleaned and valve gear checked, with particular attention to tappets.

The 10,000-mile phase of inspection and check is considered to be the most important and perhaps the key to any success of the system. It is felt essential that efficient injectors, valve gear and filtration and good lubrication form the very essence of long life and performance of a vehicle's power unit.

Of recent years a lot of publicity has taken place concerning air pollution caused by exhaust fumes

(*Continued on page* 14)

* Abstract of paper read at the annual conference of the Municipal Passenger Transport Association in Douglas on September 14.

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The Atlantean is living up to its promise. More and more operators—both municipal and company—are placing repeat orders, because their present Atlanteans are providing the answers to their transport problems.
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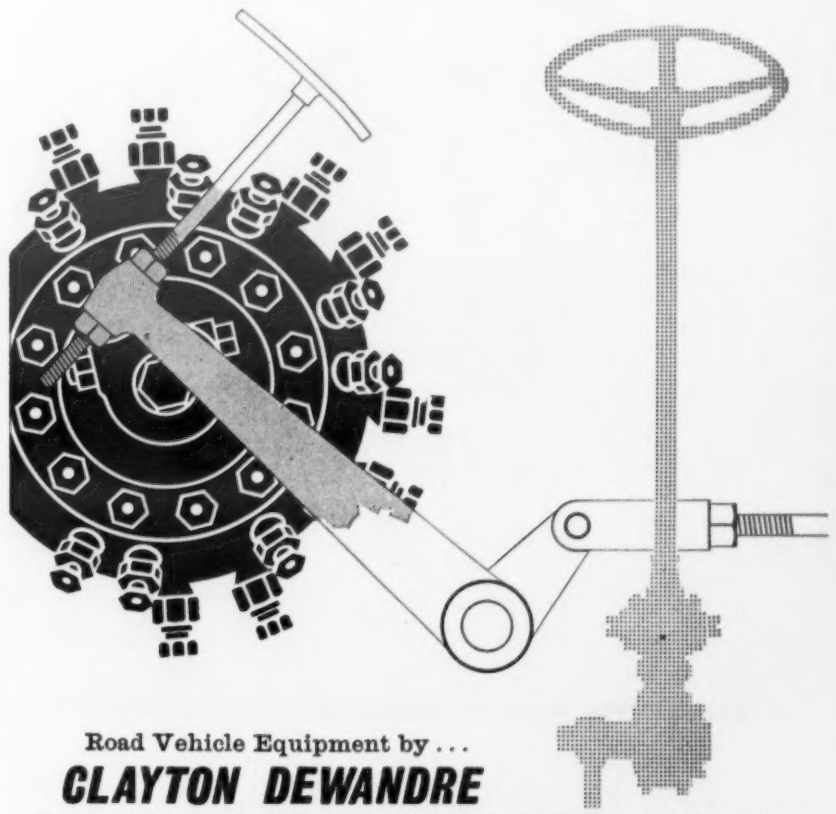

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B.M.C. SMALL UTILITY

Austin Seven Countryman and Morris Mini-Traveller

THIS week the British Motor Corporation announced a new small dual-purpose vehicle which will be marketed as the Morris Mini-Traveller and the Austin Seven Countryman. Costing £439, plus £184 0s. 10d. purchase tax in the United Kingdom, they are considerably cheaper than any other European car of similar type as well as being technically more advanced. A strong demand exists for estate cars of under 1,000 cc. engine capacity and a length not exceeding 11 ft.—vehicles which can be used both for pleasure and business and giving low running costs.

The new Countryman and Mini-Traveller offer high performance, economy, compactness and handling ease as well as all the features of the remarkable Austin Seven and Morris Mini-Minor saloons, together with an all-steel ash-framed body of quite unexpected roominess. The Morris is available in single colours of red, white and blue and the Austin is Speedwell blue, Tartan red and Farina grey.

Accommodation and Capacity

Frontal treatment of these cars is identical with the saloons from which they are developed, but the wheelbase and the body behind the doors is longer and similar to the dimensions of the vans of the series. The upper half of the body is fitted with windows and the panels are stiffened by the addition of attractive ash framing. There are also twin vertical rear doors fitted with automatic check stays. With four adults seated in comfort there is still 18¾ cu. ft. of loading space at the rear. The rear seats permit ample freedom of movement and leg room; when folded they increase the loading area to 35¼ cu. ft.

The power unit is the 848c.c. four-cylinder o.h.v. engine which has won worldwide acclaim for the van and saloon versions of the car. Mounted transversely across the front end of the car driving the front wheels through helical spur gears with universal joints and short open shafts, the unit develops 34 b.h.p. at 5,500 r.p.m. Like the saloon, the new estate car has independent rubber suspension on all four wheels, which allows the loading platform to be installed much nearer to the ground than in the case of a car with space-consuming leaf

New Austin Seven Countryman dual-purpose vehicle, available also as Morris Mini-Traveller

springs and a transmission shaft driving a rear axle. Apart from easing the labour of loading, this arrangement ensures a low centre of gravity with consequent impeccable road-holding.

The Traveller and Countryman have two wide front doors through which there is quick access to the rear compartment. Each door is fitted with sliding windows. Parcel accommodation at the front end is provided by a deep tray on each side of the central instrument nacelle, while there are also capacious pockets in both front doors. In the rear compartment there are also boxes on each side of the rear seat.

A further indication of intelligent utilisation of available space is the stowage of the spare wheel in a tray set in the floor behind the rear seat. The battery is in a well next to the spare wheel, away from the engine heat. A quickly detachable floor panel makes a lid for the spare wheel and battery compartment. There is a headlining of washable material and a lamp in the roof. The double side windows slide open and the vertically hinged loading doors also have large windows.

Technical Specification

The four-cylinder petrol engine has overhead valves with push-rod and rocker operation; bore of 62.94 mm. (2.48 in.) and stroke of 68.26 mm. (2.69) give a cubic capacity 848 cc. (51.74 cu. in.). There is a three-bearing crankshaft and main bearings and connecting-rod bearings have renewable liners. The compression ratio is 8.3:1. Other equipment includes a full-flow renewable-element external oil filter and magnetic sump drain plug. Cooling is by pressurised thermostatically controlled system with impeller pump and fan and ignition is by 12-volt battery and coil, with automatic centrifugal-vacuum advance and retard. An S.U. automatic semi-downdraught carburetter is fed from a 5½-gal. tank by rear-mounted S.U. electric fuel pump.

Transmission is by single dryplate clutch with hydraulic operation and four-speed synchromesh gearbox giving overall ratios of 13.659, 8.178, 5.316 and 3.765 to 1. A combined transmission casing and oil sump is below the engine crankcase. The transversely mounted unit has its mainshaft in constant mesh with a differential assembly mounted on the side of transmission casing. Drive is transmitted by universal-jointed shafts to the front wheels.

Brakes and Steering

A pendant-type pedal operates Lockheed hydraulic compensated brakes, with 7-in. diameter drums and leading and trailing shoes all round. Simple shoe adjustment simultaneously adjusts the handbrake, which has a pull-up lever and operates the rear brakes mechanically. Independent front suspension is by rubber cone spring units, with upper and lower suspension arms attached to swivel-pin hubs by ball joints. Independent rear suspension is by rubber cone spring units and radius arms; hydraulic telescopic dampers are fitted at front and rear.

Ventilated disc-type wheels with four-stud fixing carrying Dunlop 5.20-10 tubeless tyres. Rack-and-pinion steering gear has direct linkage to steering arms on swivel pins and can be arranged with left- or right-hand control; it gives a turning circle of 32 ft. 9 in. Electrical equipment includes a high-output dynamo with compensated voltage control, 34 amp.-hr. battery, complete lamp set, instrument lighting and roof lamp, dual-arm windscreen wipers and flashing direction indicators.

Standard equipment includes heater-demister, windscreen washer, two wing mirrors and pile carpet floor covering, while radio and front bumper overriders are available as optional extras.

★

DAIMLER FLEETLINE

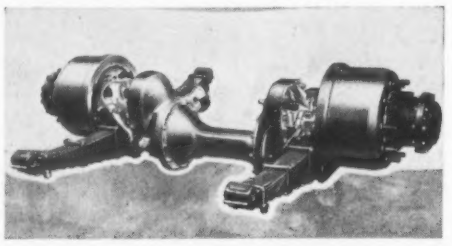
(*Continued from page 3*)

turning circle is 68 ft. All wheels and tyres are interchangeable. The three-piece 7.50 by 20 in. wheels have 6.3 in. offset and standard tyres are 10.00-20 12-ply rating. A 35-gallon tank is fitted on outriggers behind the front axle. Nylon piping is used for feed and return lines. Chassis lubrication is by hook-on type grease nipples, but automatic lubrication can be supplied at extra cost.

M.C.W. Body

The 78-seat Metropolitan-Cammell-Weymann body, measuring overall 30 ft. long, 8 ft. wide and 13 ft. 4 in. high, seats 34 in the lower saloon and 44 in the upper saloon. The framework is of all-metal construction, using light steel and aluminium-alloy members, with lateral strengthening provided by waist-high partitions at the rear of each wheel box and floor-to-ceiling partitions behind the driver and the entrance platform. The main side pillars are of special tubular section, extending to the upper saloon waist and are connected between the waist and floor level by 18-g. aluminium-alloy stress panels suitably stiffened.

Carlines supporting the upper saloon floor are of steel channel section, connected to main side pillars by pressed-steel brackets designed to take an aluminium-alloy floor coving panel as part of the structure, solid riveted throughout. Roof carlines extending down to waist are rigidly fixed to pillars. The exterior panelling is of 19-g. aluminium, except for the upper saloon front and rear corners below waist, front and rear domes



The dropped double-reduction rear axle that gets the frame height down

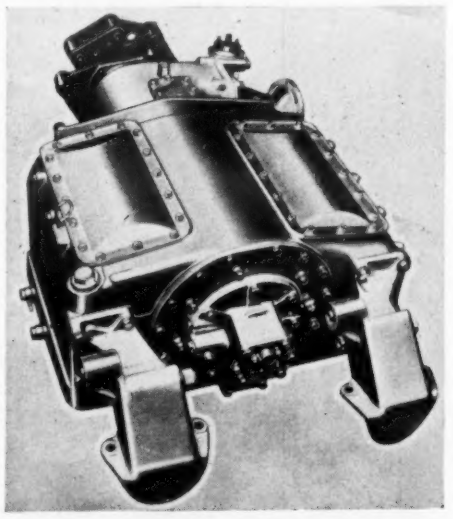
and windscreen pans, which are of resin-bonded glass fibre, all pop-riveted to pillars, carlines and so on.

Flooring in both saloons is of ½-in. resin-bonded plywood, gangways and the area at top of the stairs covered with Treadmaster Multi-slats. The floor under seats and footstools is covered with linoleum. Ribbed aluminium is fitted between seats and on footstools.

Driver's Compartment

The driver is enclosed by a full-depth partition at the rear and a waist-high partition at the nearside with a door to the entrance platform. Seat mechanism is a Widney Brilite Mk. 11 pedestal, fully adjustable, with cushion and squab of Dunlopillo trimmed in Vynide. The windscreen is the Auster double-panel unit and a Kelbus signalling window is fitted. Two air-operated windscreen wipers are of Trico-Folberth make.

The lower saloon has four H.S.C. Phantom hinged ventilating windows. Intake louvres above the windscreens are ducted to an outlet above the nearside windscreen. A bank of louvres with inside baffle and grille is fitted above each rear wheelarch-



Daimatic four-speed gearbox incorporating a right-angle drive to the dropped axle

bay window. In the upper saloon there are four Beclawat Boreas tipping ventilating windows; two Auster double-deflecting vent windows at front end and two Airvac extractor type ventilators with stainless steel undergrids. All windows are glazed with toughened sheet glass. Emergency exits are arranged in a hinged window in the upper saloon and by means of a hinged door situated at rear offside in the lower saloon.

Platform and Staircase

The front platform is closed by air-operated double jack-knife doors, incorporating Peters gear, operated by the driver. An exterior emergency valve is fitted. The platform floor is of 10-g. aluminium-alloy floor plate covered with Treadmaster Multi-slats and Pneustrip nosing to step edge. The staircase has chequered aluminium-alloy risers and plywood treads fitted with

(*Continued on page* **14**)

The Distributor type Fuel Injection Pump

MINIMUM SPACE REQUIRED FOR INSTALLATION

COMMERCIAL MOTOR SHOW STAND 231

The DPA distributor type pump is not only very small and light. It is arranged for simple types of drive and can be fitted snugly against the side of the engine, making a very compact installation. Calibration and phasing are not required with this type of pump. The housing is filled with filtered fuel oil under slight pressure, and no special lubrication is required, while dirt and water are excluded. The DPA is ideally suited for high speed diesels.

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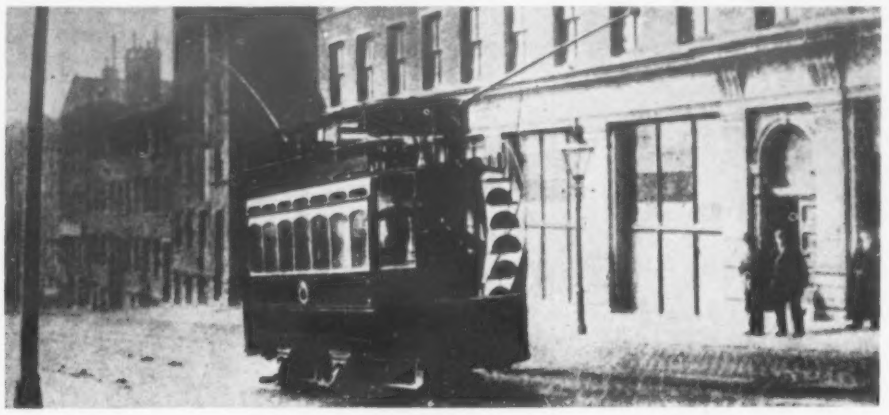
AP 960

GENESIS OF THE ELECTRIC TRAMCAR

Little-Known Experiment in Bradford

FIRST electric street tramway to be supplied with current from an outside source was the Holroyd Smith conduit line in Blackpool. Although the Thomson-Houston overhead line in Leeds of 1891 is well-known, little has been written of Bradford Corporation's first contribution to the development of overhead electric traction. Although now perhaps forgotten, it was a notable one. Bradford can make no claim to have been first in the field, although it was only four months after Leeds had inaugurated the first overhead trolley-wire system in the country, between Sheepscar and Roundhay, that Bradford's experimental line in Cheapside was equipped.



The Holroyd Smith car ascending the steep bank of Cheapside in Bradford during March, 1892

The experiment was notable chiefly on account of the advanced nature of the electrical and mechanical features of the car itself, some of which were brought to light again many years later and hailed as something new. Perhaps the chief reason for its having lapsed into obscurity was that it never went beyond an experiment. It was successful in every way, exceptionally so; but the cost of current, generated by the early equipment of those days, was thought to be prohibitive. The designer of the special gearing of the car, Anthony Reckenzaun, a pioneer who had devoted much study to, and had great faith in, the future of worm gearing for tramcars, died young, and possibly much was lost by his decease.

Steep Route

The Cheapside line was the line used normally by the steam trams, extending from Forster Square to Piper's Grave, i.e. the junction with North Parade. The curve out of Cheapside into Kirkgate had a sharp radius of 35 feet and a gradient of 1 in 13½, to negotiate which the special gearing was designed. The total length of the experimental line was 660 yards; the part in Lower Kirkgate had a gradient of 1 in 150, in Cheapside 1 in 14½, and along Manor Row 1 in 90.

Electric current was supplied from the Bradford Electricity Works at a pressure of 305 volts, and collected from an overhead trolley-wire suspended above each track on span wires attached to the buildings and blue-painted wooden poles, each with a pointed finial. The whole of the installation was under the direction of Michael Holroyd Smith of Halifax, and the car itself was also constructed under his supervision. The car body was built by the Lancaster Carriage and Wagon Co., Limited, and the truck was constructed by Easton and Anderson, Limited, Erith. Seating was provided for 18 inside, 12 on reversible seats outside and six on seats over each short balcony, a total of 36 passengers; a trolley with a fixed head was mounted at each end for collecting the current, the wire being directly over the centre of each track.

Motors and Worm Drive

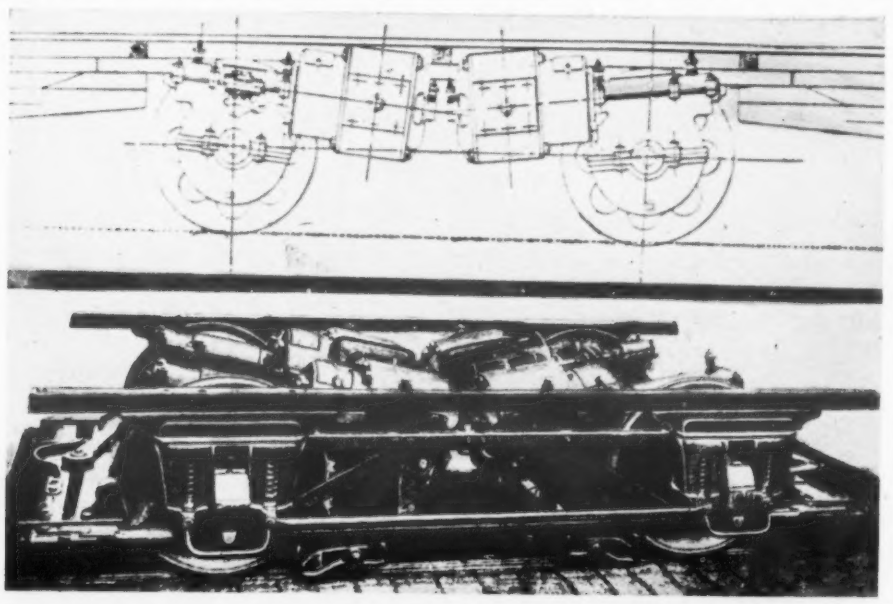
Dual-type motors were specially designed for the car. Each of the two motors had one pair of field magnets and two armatures, giving an independent drive to each wheel in order to reduce friction on the curves to a minimum. Two wheels were keyed to the axles and two to sleeves which were free to revolve independently of the axles. The Reckenzaun worm gears consisted of a triple-thread worm mounted on the end of each armature shaft, with a thread pitch of 4½ in., and four worm wheels with a pitch of 1½ in. and 34 teeth, giving a gear ratio of 11 to 1, mounted with each road wheel on the axles and sleeves. The long pitch thread enabled the car to run freely with power off. Ball bearings were provided in the thrust collars to reduce friction in the gears, which were completely enclosed and ran in oil.

The objects of providing, in effect, four motors, were to overcome the difficulty of starting the car, which weighed 6½ tons, about four tons being accounted for by the truck, motors and gears, to enable a powerful effort to be exerted when ascending a gradient, and as stated previously, to reduce friction on curves. The arrangement provided three running speeds: (1) with all four armatures in series for maximum starting torque; (2) two pairs in series for half speed; (3) all four in parallel for full speed. A resistance was provided for turning on the current gradually, and for minor speed regulation. The four motors gave a total of 28.5 h.p., and on test with the car fully loaded with 40 passengers, the current taken when ascending Cheapside was about 70 amperes.

Truck Design

On the truck the hornblocks were bolted to the main frame, which consisted of angle or T-upper and flat lower side-framing, with upright and cantilever stays. The top plates, on which the car body rested, were supported on coiled springs at each side of the axleboxes. The wheels were made of chilled cast iron, 28 in. in diameter. The wheelbase was 6 ft. The brake rigging on the wheels was similar to the type which came into general use on electric cars later, except that the coupling rods at the sides were duplicated.

One rod at each side coupled the inside pressure bar, on which the brake shoes were mounted, at one end with the outer pressure bar at the other end. The other pair of rods gave the same effect from the other end of the car. A lever mounted between each pair of pressure bars forced them apart at the end where the brake was being applied, the coupling rods drawing inward the inner pressure bar at the other end and thus forcing the shoes on all four wheels. The lever was connected to the conventional staff and handle outside the front dashplate by a chain. A slipper brake of Holroyd Smith's patent design was also fitted.



Reckenzaun worm drive was used on the truck of the Bradford electric car of 1892

Public Trial

The first public trial of the electric car took place on Tuesday, April 12, 1892. On May 3 Major-General Hutchinson and Major Cardew, Inspectors of the Board of Trade, witnessed tests in Cheapside. A delay occurred when the party had boarded the car in Forster Square, owing to a steam engine and tram having become stuck half-way up Cheapside. Another engine brought up behind failed to move it, and eventually both engines and car had to be run back into Forster Square. The entire performance of the electric car fulfilled all expectations. The four motors coupled in parallel took a full load round the sharp curve and up the hill at a smart speed. In descending the hill, the car driving the motors provided electric braking after a certain speed was attained, but the inspectors ordered the use of the Holroyd Smith slipper brake.

It was announced that the car would run for a month. On Monday, May 16, it started to carry passengers; 1d. fare was charged from Forster Square to Piper's Grave. The borough surveyor's report, dealing with the operation of the electric car and the prospects of utilising electric traction on the Wakefield Road tramway, was made public on June 24, 1892. Estimated working expenses of the Wakefield Road section, exclusive of rental, would have been 10¾d. per mile, while receipts of more than 11d. or 1s. could not be expected. This meant that the alternatives would be to operate at a loss and subsidise the tramway out of the rates or to use steam traction and await further developments. The latter course was decided upon. We are indebted to the courtesy of Mr. Chaceley T. Humpidge, general manager, Bradford City Transport, for the opportunity of reproducing a recently discovered description and illustrations of this interesting pioneer vehicle.

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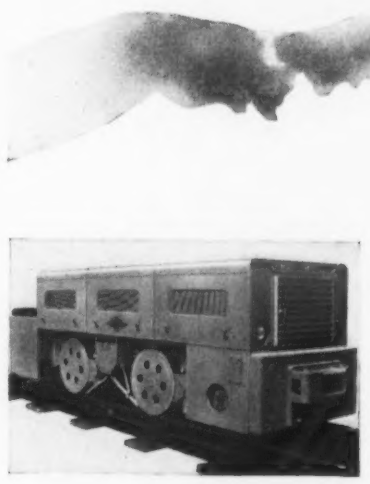

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STC AND RAILWAY MODERNISATION

CARRIER CABLE & TRANSISTOR EQUIPMENT FOR BRITISH RAILWAYS, LONDON MIDLAND REGION

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CABLE

All-Plastic Insulated and sheathed Carrier Telephone Cable on main and spur routes — total route length, 204 miles. Major part installed aerially, attached to a messenger wire by PVC covered lashing wire, the remainder laid in troughing.

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Cable is equipped with terminal and repeater equipment of the STC All-Transistor 12-circuit 2-wire Carrier Telephone System which provides twelve 2-way high quality wide band circuits on one cable pair. Features of the system are low power consumption; out-of-band signalling, in-built carrier supplies; automatic gain regulation. On any one of the twelve circuits it is possible to employ up to 24 V.F. telegraph circuits.

STC supply many different types of cable and multi-circuit transmission equipment for Railway Communications.

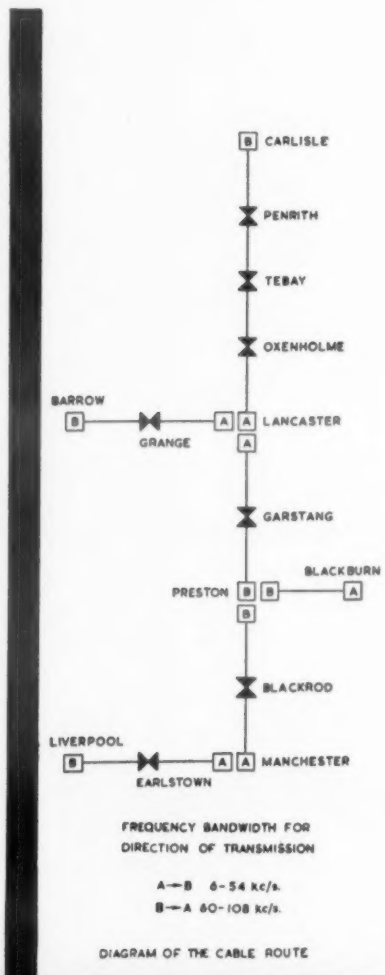

DIAGRAM OF THE CABLE ROUTE

RIGHT: STC Engineer inspecting a 1 quad carrier cable installation on British Railways Manchester-Carlisle line.

LEFT: STC unattended repeater equipment at Grange-Over-Sands.

60/4G

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PORTABLE BALLAST TAMPER

Atlas Copco Self-Powered Unit

A PORTABLE pneumatic tool coming into increasing use in railway track maintenance is based on the already well-established Atlas Copco Cobra portable drill. The tool incorporates its own two-stroke motor and thus needs neither air hose nor cable; it weighs only 53 lb. and can consequently be lifted clear of the line with ease when a train approaches. It is said to have proved, particularly in Germany, to be well suited to track maintenance work, notably ballast tamping. An advantage of the Cobra is that it was designed from the outset as a one-man tool. Only small modification was required to adapt it for ballast tamping and the ballast tamping version can be quickly converted to a road or rock drill, post holer, spade hammer or rammer.

Equipped with a pull-type starter, the Cobra has flywheel magneto ignition, the coil and condenser being impregnated against damp. Petrol is admitted to the carburetter by a valve instead of a float and there is an ample suction filter. There

Two Atlas Copco Cobra lightweight drills in use for ballast tamping on a Düsseldorf railway track

is a set-screw on the carburetter for controlling the fuel supply. Both motor and percussion pistons work within the same cylinder bore. The engine piston also compresses the air which passes to the underside of the striking piston, thus returning it to the firing position. The machine runs at a nominal speed of 2,300 blows per minute.

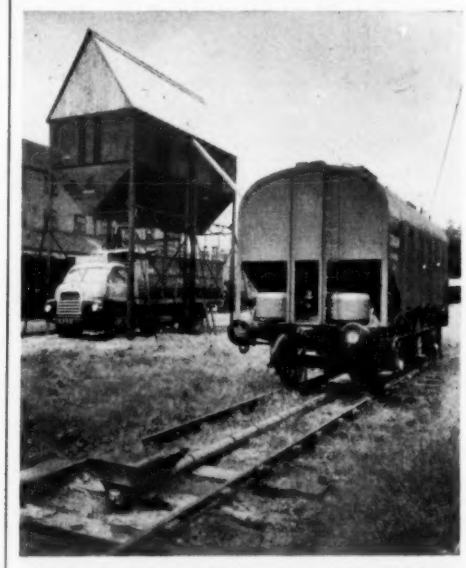
As far as performance is concerned, it is stated that in three months' continuous operation, a Düsseldorf track-building contractor has had a constant record of 330 yd. of track laid per shift by an eight-man team using Cobras, a 50 per cent improvement upon the results obtained with alternative hand-operated tools.

★

BULK GRAIN TRANSFER

From Rail to Road Vehicle

TRANSFER of grain from railway wagons into bulk road carriers is the object of an installation carried out by A. and W. Evans, Limited, a Leicester miller, at its rail siding. It is claimed that 10-ton bulk road carriers can be filled direct from the overhead storage bins in 3-5 min. A 41 ft. long Mayrath auger-type conveyor has been laid along the centre of the railway track and provided with two inlets to coincide with the dis-



A Bedford bulk carrier loading at A. and W. Evans siding, with a rail wagon discharging into the central conveyor

charge points of two 20-ton bulk railway wagons. This conveyor feeds into a hopper (immediately behind the wagon seen in the illustration) from which another 41 ft. Mayrath elevates the grain at an angle of 45 deg. to two overhead bins with a capacity of 15 tons each. The grain, which is transferred from railway wagon to the overhead storage bin at the rate of 40 tons per hour, can then be discharged by gravity feed into bulk road carriers for transport to the mills. The Mayrath conveyors were supplied by Gordon Felber and Co., Limited, Spirella House, Oxford Circus, London, W.1.

MODERN AIRWAYS and COMMERCIAL AVIATION SECTION

WORLD AIR TRANSPORT

The Search for Lower Fares

DIRECTOR-GENERAL'S ANNUAL REPORT TO I.A.T.A.

The 16th annual general meeting of the International Air Transport Association was opened in Copenhagen on September 12 by Mr. Viggo Kampmann, Prime Minister of Denmark, in the presence of King Frederik IX and Queen Ingrid and the Ministers responsible for transport in the three Scandinavian countries. Mr. Ake Rusck, president of the Scandinavian Airlines System, assumed office as president of I.A.T.A. in succession to Mr. Seijiro Yanagita, president of Japan Air Lines. Thereafter Sir William P. Hildred, director-general, presented his annual report, an abstract of which appears below.

I AM happy to report that 1959 was a better year for the industry than its predecessor.

We have several ways of measuring the results of our operations. The first is the I.C.A.O. data for "world" scheduled international and domestic traffic, which means the world with the major exclusions of the U.S.S.R. and the People's Republic of China. By that measure, passenger transport increased during 1959 by 14 per cent to a total of 97,000,000,000 passenger-kilometres; cargo traffic increased by 16 per cent to 1,920,000,000 tonne-kilometres; and mail traffic increased 11 per cent to 520,000,000 tonne-kilometres. All these percentage increases are greater than those registered during 1958.

These figures indicate that 97,000,000 passengers were carried by scheduled airlines in 1959. This represents an 11 per cent increase in the human load over 1958 and points to an uplift of over 100,000,000 passengers in the current year.

It is also relevant to take a look at the performance of the U.S. domestic airlines, since they carried 51,000000, or 53 per cent, of the world's scheduled passengers last year. This in contrast with the previous year when there was a recession and a number of strikes, and when U.S. passenger traffic showed an actual decrease. Happily, 1959 was a relatively satisfactory year and produced an increase in passenger traffic of 6,000,000, or 14 per cent.

We come now to the traffic of I.A.T.A. members as a whole. On the basis of scheduled revenue tonne kilometres flown, they account for 88 per cent of the scheduled world total of 10,920,000,000 last year and provide the best guide to the development of the industry. Since the membership of I.A.T.A. expands from year to year, it is necessary to compare the results of those 86 airlines who were members in both 1958 and 1959. Their overall traffic in terms of tonne-kilometres increased by 13.7 per cent last year, as compared with the world-wide increase of 12.2 per cent. Their passenger traffic increased by 11.4 per cent, or 8,000,000, as compared with the world growth of 11 per cent and 10,000,000. Their cargo carryings were up 18 per cent, as compared with the 16 per cent world increase; and their mail traffic grew by 12 per cent—or by a little more than the world rate.

THE NARROW MARGINS OF AIR TRANSPORT PROFIT

Operating revenues and expenses of the world's scheduled airlines*: 1955-1959

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959**
Operating Revenues (*U.S. $ millions*)	1,050	1,348	1,397	1,543	1,804	2,050	2,314	2,560	3,025	3,510	3,971	4,122	4,610
Operating Expenses (*U.S. $ millions*)	1,170	1,397	1,406	1,502	1,780	2,063	2,317	2,528	2,947	3,426	4,012	4,107	4,470
Operating Profit or Loss (*U.S. $ millions*)	−120	− 49	− 9	+ 41	+ 24	− 13	− 3	+ 32	+ 78	+ 84	− 41	+ 15	+140
Per cent	−10·3	−3·5	−0·6	+2·7	+1·3	−0·6	−0·1	+1·3	+2·6	+2·5	−1·0	+0·4	+3·1

* Excludes U.S.S.R. and People's Republic of China.
* Excludes U.S.S.R. and People's Republic of China.
** 1959 Estimated.

Financial Results of 1959 Operations

Traffic carried is one thing: revenue earned is quite another. It is possible to express a certain guarded optimism about the financial result of 1959 operations, at least to the extent of discerning some improvement over previous years in which, while some airlines have had good returns, the industry as a whole had little or no operating profit. The I.C.A.O. estimates for 1958 which I quoted at the last annual general meeting indicated an operating loss of $160,000,000, or 3.7 per cent. As the result of subsequent revisions, the 1958 figures now show operating revenues of $4,122,000,000 and operating expenses of $4,107,000,000 which leaves an operating profit of $15,000,000—or a little less than half of one per cent. Better than nothing, of course; but precious little in terms of the work done, the workers involved, and the formidable amount of capital involved.

The latest preliminary I.C.A.O. estimates for 1959—again, they can only be tentative at this point—suggest a definite improvement. Operating revenues are estimated to have increased by $488,000,000, or 11.8 per cent, to $4,610,000,000. On the other hand, operating expenses have apparently risen $363,000,000, or 8.8 per cent, to $4,470,000,000. This leaves a tentative operating profit of about $140,000,000, or 3.1 per cent.

Equipment

Re-equipment of the industry goes on at a fantastic rate. At the end of 1958, I.A.T.A. members had taken delivery of 14 jets. Nine months later, they had 110. By the end of this month there should be about 290 in their combined fleets. And the total at the end of 1962 should be about 600. In actual numbers, the total operating fleet of members at the end of 1959 stood at 3,479 aircraft, as compared with 3,402 a year before. These total figures conceal some significant changes. Forty aircraft have been added to the fleet by the accession of new members. A total of 246 older aircraft have been retired, while 126 new jets, 150 new turboprops and seven new helicopters have been brought into operation.

Great as the replacement rate has already become, the process seems only to be beginning; and it is estimated that there will be a surplus in the industry of anywhere from 1,200 to 1,800 piston-engined aircraft by the end of 1961. The disposal of these machines, many of them not yet fully depreciated, is itself a problem of great magnitude. Some can be converted to all-cargo use, a small number can be re-fitted with turboprop engines, others can be used on charters. But the market for used piston-engined aircraft is not a strong one now, and the prospect for 1961 and 1962 is certainly no better.

The initial average utilisation of the jets in daily revenue service seems to be around 7 hr., while some companies have achieved 8 and 10 hr. per day. Even with initial utilisation rates, the jets have proved themselves as magnificent instruments for the mass production of air transport. By the end of next month, I.A.T.A. members should have a total of 29,000 jet seats in service.

Pooling and Co-operation

Capital requirements are far greater than ever before. Capacities have swollen. The costs of maintenance facilities, training, spares stocks, sales and promotion and traffic handling—indeed, the costs of an infinite variety of items have all increased by leaps and bounds. One result has been a speed-up in the trend toward economic co-operation between airlines. Co-operation between member airlines has taken many forms. The past year has seen these forms extended in participation and scope. In addition, there has been a movement to still newer types—from the highly elaborated Air Union project to more piecemeal and pragmatic arrangements for equipment pooling, pooling of technical facilities, joint sales organisations, common use of ground equipment, co-operative overhaul and maintenance, pooling of spare parts and interchange of aircraft and crews. The driving force behind all of them is basically economic. They are the airlines' only conceivable defence against the overwhelming demands of the jet for capital, organisational support and revenue traffic. As such they are inevitable and necessary from the point of view of the carrier, and they are also equally desirable for the consumer's pocket.

But we must not forget that the public has other requirements and desires besides those of cost; and that they will avoid any tendency to underschedule and to diminish that touch of individuality in service which helps to keep air transport interesting, progressive and dynamic. The final touchstone of any co-operation agreement is whether it results in more efficient and economical service to the public without detracting from its convenience and attraction, and from those touches of personality which the particular public has learned to expect.

Noise

The industry has been acutely aware of the noise potential of its aircraft; and it has already done a great deal to minimise the noise itself, as well as to reduce its impact on surrounding communities. More than $50,000,000 has been spent in the development and installation of sound suppressors for jet engines. The airlines sacrifice a quarter of a ton of payload per flight in order to hang noise suppressors on our aircraft. We have built expensive baffle systems and hush houses to diminish the noise of running up. And we have adopted takeoff techniques in order to achieve minimum noise which have further substantially affected the economy of jet flying. We shall continue our efforts to keep noise to the lowest possible minimum; and the concerted activity of the I.A.T.A. Noise Abatement Study Group is an earnest of our determination.

We can certainly help to avoid further complaint by pressing for adequate zoning regulations which will keep future housing from crowding round airports as a source of still new problems. We can pay ever closer attention to the state of our day-to-day community relations. Experts in this field have found that communities which believe that their airport authorities and airlines are doing a competent and sympathetic job manifest a 30 per cent greater tolerance towards noise than do those in which the authority has not minded its public relations.

Lower Fares

We are still experimenting. It is as yet too early to forecast the results of this year of economy services and special excursions between Europe and Africa and Europe and the Far East, and of the special 17-day off-season excursion fares over the North Atlantic, but it is probably safe to assume that they, too, will bring to international tourism and flying new thousands—and one hopes millions—who have never flown abroad before. We have by no means been the only beneficiaries of this mass movement of tourists: indeed, airlines have been among the lesser ones. In 1958 alone, it is estimated that this expansion of tourism which air service has largely made possible injected at least $6,000,000,000 into the channels of international exchange. It has meant foreign currency earnings of $491,000,000 for Italy, $454,000,000 for France, $432,000,000 for Britain and many millions more for virtually every country.

Any producer who has managed to keep his prices steady in terms of units of money these past 16 years has achieved a reduction in actual price equivalent to the rise in the purchasing power of the public to whom he caters. And if he has been able to bring down the price in money as well, he has doubled his victory. This is what has happened in air transport. The international airlines are high on the list of those producers who have achieved this double triumph over inflation. Despite the fact that our annual operating costs have risen 280 per cent in 10 years, we have managed to squeeze out a sufficiently greater increase in productivity that our fares and rates have not only held the line, but have also been significantly reduced in many instances.

Looking ahead a few years, when the delivery

(*Continued on page 21*)

STRIKING SUCCESS!

THE striking success of the new Commer ¾ ton range is enthusiastically confirmed by transport operators all over the country. Not surprising! Note the compact good looks, the ample loadspace, and the extreme manoeuvrability which stems from forward control. Add to this, hard-cash economy and trouble-free operation. Then you'll know why each of the 19 factory-built derivatives in the Commer ¾ ton range is outstanding in its class today.

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Earls Court

September 23 – October 1

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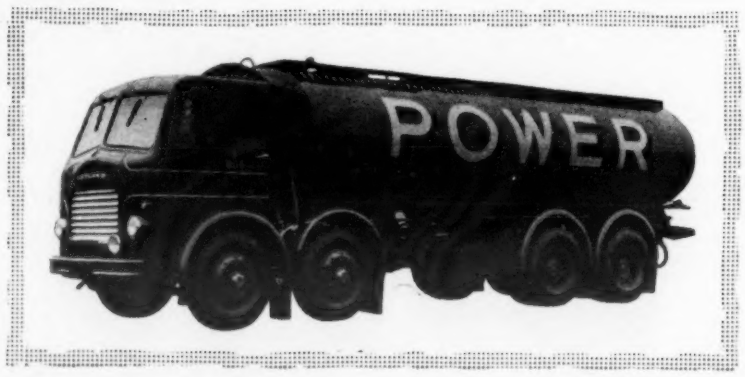

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LETTERS TO THE EDITOR

Development of Electric Traction

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

Electric Traction

SIR,—Although one hesitates to criticise Mr. F. J. G. Haut's excellent articles I feel that attention should be drawn to what may be perhaps no more than a slip of the pen when he refers to the City and South London Railway (the first section of which was opened in 1890) as being the first electrified railway in England (MODERN TRANSPORT, September 3). The pioneer electric line in this country was, of course Magnus Volk's line at Brighton, the original quarter-mile section of which (from the Old Chain Pier to the Aquarium) was opened on August 3, 1883. In 1884 this line was reconstructed to Paston Place, with a third rail conveying current at 50 volts. The Portrush line—admittedly in Northern Ireland—was electrified in September, 1883, and the Bessbrook and Newry in October, 1885. Mention could also be made of the Ryde Pier Railway which was electrified by Siemens in 1886. The City and South London tube was, therefore, only the third electrified railway in England (and the fifth in the United Kingdom)—although it can of course claim to be the first electrified tube line.—Yours faithfully,

JOHN R. BATES.

15 *Landswood Road,*
Oldbury,
Birmingham.

SIR,—In the second of his two articles on electric traction (MODERN TRANSPORT, September 3) Mr. F. J. G. Haut repeats the astonishing statement that at no time prior to 1945 was railway electrification carried out for reasons specifically connected with railway economics. Equally misleading is the statement that in the past 20 years the railways have lost their monopolistic position in the transport world.

In certain cases the railways had lost their monopoly more than 50 years ago—the 1909 electrification of the South London line, then in competition with the L.C.C. tramways, is a case in point. Indeed one could cite hundreds of similar instances where electrification was carried out prior to 1939 because the railways concerned were in direct competition with road transport or wished to increase their efficiency.

Competition Not Always the Spur

One may allow that the spur was not always a matter of direct competition, but that is not to say as the author does, that the reasons for electrification were not specifically connected with railway economics. Bad coal, hard water, heavy gradients or an abundance of cheap power are all directly related to operating costs and therefore fundamental to railway economics.

The implication that in recent years the railways have been forced to adopt electrification on account of outside competition is quite untrue. Railways have never lacked for initiative; it is simply that under private ownership they were sometimes unwilling, and frequently unable, to face the massive capital charges that were involved. It is significant that in the majority of countries that have nationalised systems, electrification is regarded as a priority—although even with state backing progress is necessarily governed by available resources.—Yours faithfully,

PETER WINDING.

53 *Murray Road, S.W.*19.

Loop-Formation Traffic Flows

SIR,—I am grateful for your comments on "loop-formation traffic flows" as originated in theory by me and which are now under examination by the powers that be. (MODERN TRANSPORT, August 27.)

I don't know much about the habits of lemmings, but I have just been observing the reactions of four heavy (?) traffic flows converging upon an intersection here in Bradford as controlled under a three-phase 20 seconds each period cycle of operations where one stream moved for 20 seconds, then another moved for 20 seconds, leaving the third and fourth proceeding in opposite directions along the one lane of direction for 20 seconds.

How on earth anyone can expect the intersection to accommodate 60 seconds flow in 20 seconds with the vehicles commencing into progression *after the green light has gone up* is beyond my comprehension. At the very best it does not seem possible that the traffic flow will attain much more than one-third of normal progression speed and therefore the equation of traffic flow movement can hardly be more than normal, say 30 m.p.h. divided by three divided by three equals normal divided by nine equals 3.33 recurring m.p.h. of traffic-mass progression during the cycles of operation as each segment of traffic flow passes through. As the volume of v.p.h. being passed along the major route in each direction was 546 v.p.h. (along two lanes of carriageway at that) then the rate of traffic-mass displacement was no more than nine vehicles per minute at 3.33 m.p.h., equals a measure of nett aggregate collective m.p.h. obtainment of 29.97 over 60 equals 0.5 miles during each minute in respect of each direction of flow. Result — congestion backing up of an undeterminable nature through other intersections making a traffic jam of wide dimensions. Apparently while 546 v.p.h. were making slow going through the signals an increased total of volume of flow in terms of v.p.h. was currently arriving in the vicinity of the signals and finding the road blocked by the earlier arrivals.

Effect of Signals

The signals were obviously the precipitant cause of the traffic congestion in that they themselves created the delay to vehicles which reduced the measure of traffic-mass displacement during the operative cycles. It is my contention that there exists a natural ratio of disadvantage in packing vehicles more densely along the traffic stream in corresponding relation to the reduced speed of the vehicles, as for instance a mile of flow at 600 v.p.h. at 5 m.p.h. takes around 24 changes of the signals at 30 seconds phases to pass through the signals, whereas a mile of flow of 600 v.p.h. at 30 m.p.h. would take no more than four changes of the signals to be accommodated, and while consisting possibly in vehicle content of more than one-sixth of the density of flow of the 5 m.p.h. progression rate, could at the same time consist of six times the m.p.h. factor in the equation of traffic-mass displacement being obtained.

Thus, in comparison, the district traffic flow organiser, when such officials are at last appointed as now obtains on the Continent, might obtain a replacement of 600 v.p.h. by 5 m.p.h., equals 3,000 aggregate net m.p.h. rate over the intersection in a given direction with the increased obtainment of possibly 900 v.p.h. by 30 m.p.h. equals 27,000 aggregate net m.p.h.

You have, therefore, a comparison between 3,000 and 27,000 in dealing with a thing opposite to traffic congestion, with the higher figure showing as potential advantage in moving masses of traffic over and through restricted sections of carriageway, and even if we do not yet have an agreed and universally accepted vocabulary of traffic engineering terms, I reckon my motorists will have their feet under their tea tables some time before yours, if you see what I mean.

I accept that most of my theories are couched in purely mathematical terms and do not necessarily pay tribute to the psychological reactions of the drivers. During my surveys of traffic behaviour I have noticed drivers cursing, singing, dozing in traffic queues, talking to themselves, and flirting with their companions, but I have never noticed any disinclination to accelerate in reasonable manner when given the opportunity.

In my system of formation traffic driving, I propose to extend to them the opportunity of making far more intelligent use of their accelerators than is possible at present.

Exciting, ain't it?—Yours faithfully,

WILLIAM TURNER.

Fiddlers Hill Farm,
Queensbury,
Bradford, Yorks.

Information on Competition Wanted

SIR,—MODERN TRANSPORT finds its way on to the desks of many abroad with whom I should like to be in occasional correspondence. I wonder if you would permit me the use of your columns to attract their attention.

I am interested in the way that nations of roughly comparable economic development and those which may now be travelling much faster (although not yet having gone so far) are seeking to balance the competition between the various forms of inland transport.

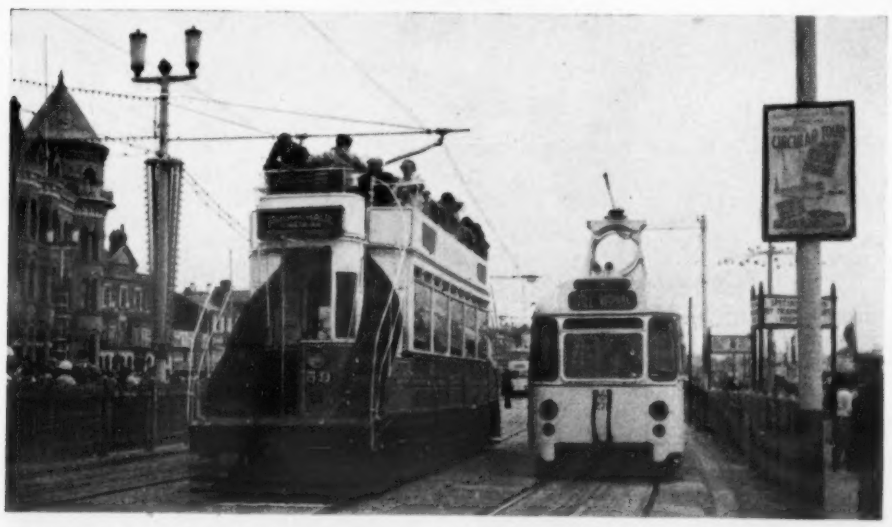
I am seeking the assistance of those working under different systems to obtain a bird's-eye view of the whole and a means of keeping it in sharp focus as methods change.

My correspondents to date are transport operators, transport trade associations, consultants and journalists, lawyers, professors and students who provide me with a variety of viewpoints sometimes upon the same facts. I reciprocate by trying to answer their questions.

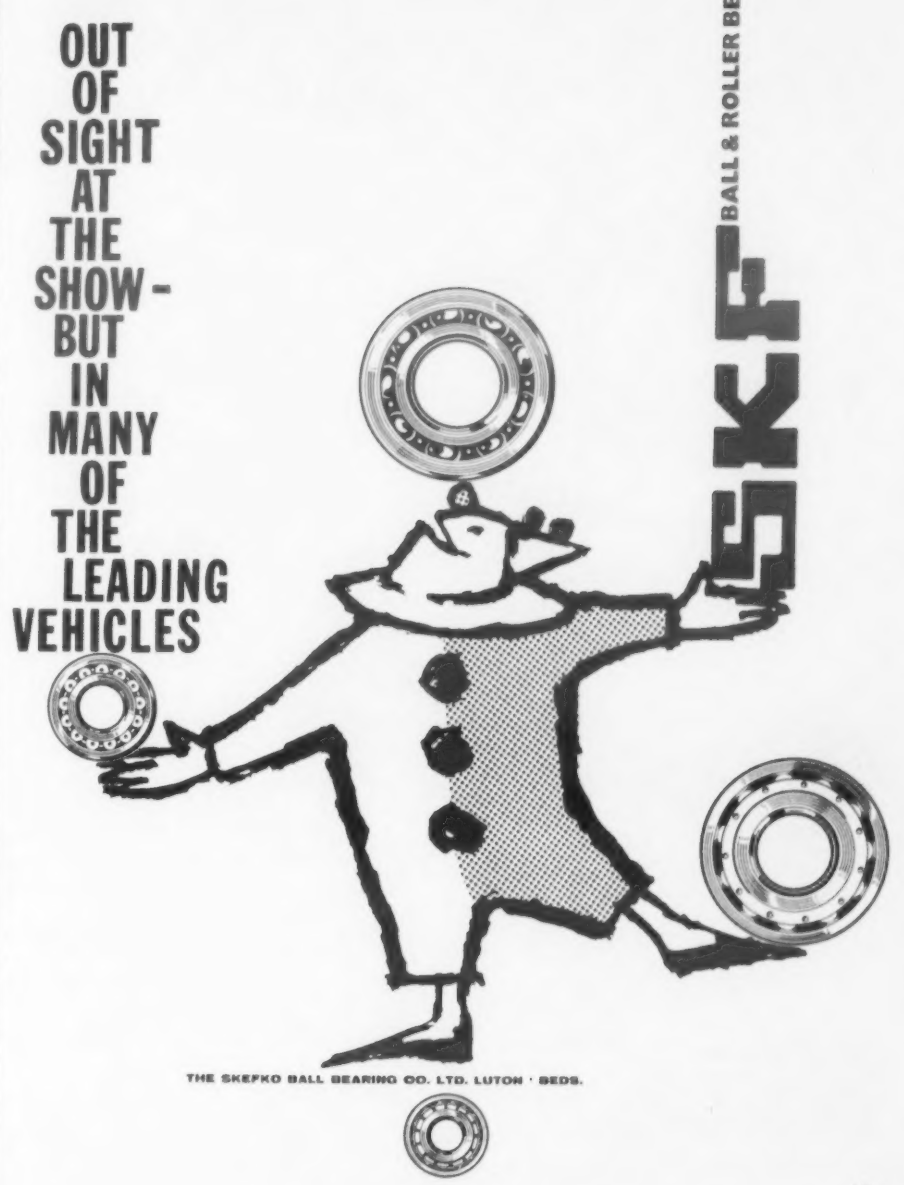
If any of your readers are interested, I should be delighted to hear from them.—Yours faithfully,

A. W. BALNE.

Collingwood,
2 The Kingsway,
Ewell, Surrey.



To mark 75 years of electric tramway operation in Blackpool the Corporation has operated some historic vehicles including this end platform Dreadnought, seen contrasted with a twin car tram and trailer set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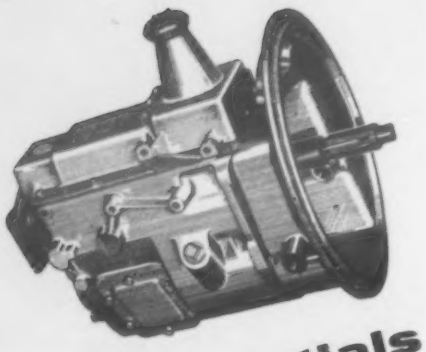

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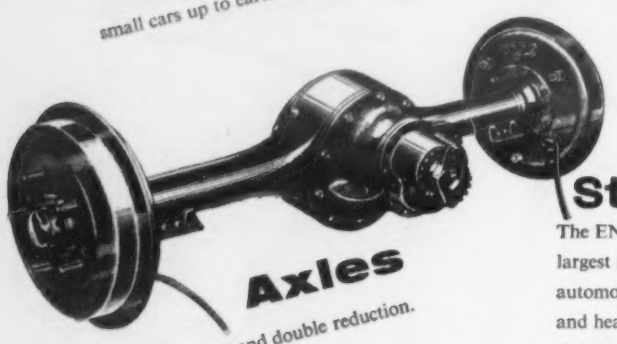

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AP 107

NEWS FROM ALL QUARTERS

Brighton Widening Scheme

The Minister of Transport has given Brighton Corporation his approval to a compulsory purchase order for a block of property on the north side of North Street between Bond Street and Ship Street where the width is only 23 ft. It is planned to widen the street at this point to 80 ft.

North-West Rail Services

Cuts in railway passenger and goods services may have to be made by British Railways in the North Western area in the coming winter if the present staff situation does not improve. The area services are 1,824 men short, and an official said recently: "In case of an epidemic or if there is heavy fog this winter, the shortage of men may hit supplies to industry and lead to cuts in passenger services."

Closing of Glasgow Central on Sundays

Glasgow Central Station will be closed on Sundays during the forthcoming winter. From September 18, 1960, to March 26, 1961, inclusive, Sunday train services which normally use Glasgow Central Station will start from or arrive at St. Enoch or Buchanan Street stations. These arrangements are necessary, because of important work in preparation for the electrification of the Cathcart Circle, Kirkhill, and Neilston High lines.

C.T.C.C. and Cleanliness

Following a meeting of the Central Transport Consultative Committee in London on September 13, the chairman, Sir Ronald Garrett, expressed the view that the British Transport Commission was not doing all that it could to improve the standard of cleanliness in trains and at stations. The committee also felt that, if a lack of effort in brightening existing stations resulted from the Commission's economy campaign, then, in its opinion, it was false economy. It was no good having a modernised railway system unless the passengers were attracted to it.

Petrol Storage Regulations

A new revised edition of its booklet on the storage of petroleum has been prepared by the Fire Protection Association as a guide to all those responsible for the safe keeping of petroleum spirit on every scale. It covers all aspects of the best practice in storage. It begins by defining what is meant in law by "petroleum," and notes where licences for storage may be obtained. The legal requirements and recommendations applicable to stores of various capacities are listed—up to 3 gal., three to 60 gal., can and drums storage, filling stations, distributing depots and major installations. In all cases the best methods of fire protection are fully dealt with. The appendix gives additional information covering electrical apparatus in use near stores of petroleum; fire extinguishers for small petroleum-spirit fires, and examples of substances having a flash point below 73 deg. F. Copies of the booklet, *Storage of Petroleum Spirit and Petroleum Mixture*, may be obtained from the secretary, Fire Protection Association 31-45 Gresham Street, London, E.C.2, price 2s.

Service Withdrawal

On and from September 12, passenger train service will be withdrawn from Medge Hall Station, on the Eastern Region line between Doncaster and Scunthorpe.

French Railway Deficit

Government action is trending in France towards withdrawal of at least part of the state subsidy for the S.N.C.F. At the present time the annual deficit is at the rate of some NFr. 300 million (about £22½ million). A first step will be the raising of freight rates by 5-7 per cent on January 1, 1961.

Loco Repair Works at Wolverhampton

It has been stated that the British Railways locomotive repair works at Stafford Road, Wolverhampton, employing 600 men, will be used for the repair and maintenance of diesel locomotives. It was announced in January that the works were due to be closed between 1961 and 1963.

Bath Road Scheme to be Completed

An early start is to be made on the reconstruction, with 24-ft. dual carriageways and three pedestrian subways, of a further one mile of Bath Road (A4) on its approach to London Airport. The new section will be between the junction of the Bath Road with Great West Road, near Hounslow West Station, to a point in Cranford. There it will meet up with the already completed stretch of dual carriageway which extends to the main entrance to the airport. The approach via Great West Road will then be dual carriageway throughout.

S.R.U.B.L.U.K. Descends on Kent

Members of the Society for the Reinvigoration of Unremunerative Branch Lines in the United Kingdom are to shortly visit several of the branch railway lines in Kent that are threatened with closure. They are hoping to arrange meetings with local inhabitants and users of the branch lines and also representatives from appropriate authorities at stations concerned. Among the society's objects are to oppose and prevent the branch line and rural station closures if reasonable and also to encourage the use of railways in general and the branch lines especially.

Eastern Region Winter Service

From September 12, on the introduction of winter timetables, 61 per cent of the total Eastern Region passenger-train mileage is operated by diesel and electric traction. Because of modernisation work, principal expresses between Kings Cross and Doncaster are allowed another 9 min. on their journey times, and trains between Liverpool Street and Norwich will have their timings increased by 6 or 7 min. for the same reason. On the Fenchurch Street —Southend line, off-peak services will be thinned to speed electrification work. For about four months from now on steam and diesel trains are to maintain services between Shenfield and Chelmsford. The electric train service will be withdrawn to enable the line to be converted to the a.c. system of electrification. Train services between Sheffield Victoria and Manchester Piccadilly have been reorganised on a regular hourly interval basis.

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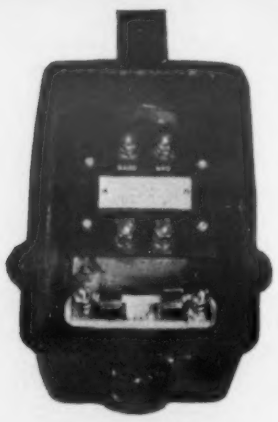

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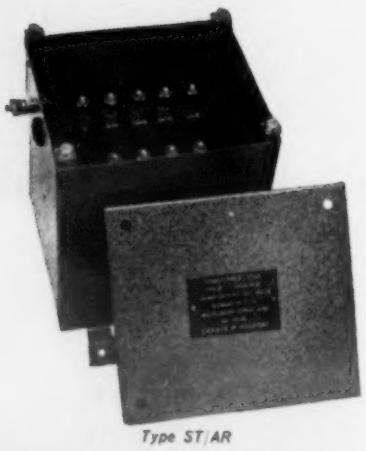

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Terminals: 2BA, 0BA, or 7/16" BSF, with or without shrouds.
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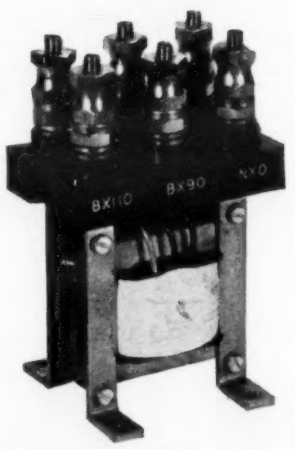

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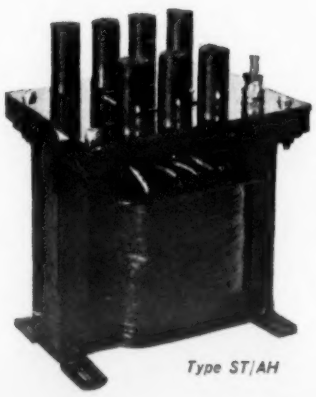

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COMMERCIAL AVIATION

B.E.A. Breaks More Records

EAST AFRICAN COMETS

BY carrying more than 500,000 passengers a month since July, British European Airways has broken its own previous records and ranks among the world's largest airlines at the present time. Giving this information in a message to the staff, Lord Douglas of Kirtleside, the chairman, said: "We have already reached the point of carrying 3½ million passengers a year and, in July, we carried 500,000 passengers in a single month for the first time. The two largest airlines in the world, in terms of passengers carried—American Airlines and Eastern—each carry about 800,000 passengers a month at the present time. This means that the number of passengers carried by B.E.A. in our own peak months has now reached a level equivalent to about 60 per cent of that achieved by each of the world's two largest air carriers." Lord Douglas went on: "B.E.A.'s traffic in July was 23 per cent above the July, 1959, level and the indications are that the rate of growth in August will also be around 20 per cent." In July, total B.E.A. revenue exceeded £5 million in a single month for the first time.

Silver City Wins Government Contract

British servicemen and their families are to be carried in civil air liners between Britain and Germany by Silver City Airways. The airline has been awarded a Government air-trooping contract for British Army and R.A.F. men and their families in West Germany. Silver City will operate about 50 flights a month in each direction from October 3. This will allow it to fly 7,000 servicemen, wives and children in and out of West Germany each month. The service will use Manston as its base in the United Kingdom.

Aer Lingus Opens Belfast Office

The Lord Mayor of Belfast, Alderman Robin Kinahan, recently opened officially a new Aer Lingus-Irish International Airlines office at Queen's House, Queen Street, Belfast. Also present for the occasion was the Lord Mayor of Dublin, Councillor Maurice Dockrell, T.D., paying his first official visit to Belfast. The new office is the headquarters of the airline's district sales superintendent, Mr. W. Miley, whose area covers a large part of the north of the country. Added importance is given to the office by the intention of Aer Lingus to open an experimental service between Belfast and Shannon.

Record Irish Air Traffic

Traffic on Aer Lingus—Irish International Airlines routes broke all records in August. During the month the airline carried over 123,000 passengers—an increase of almost 20,000 over the same period last year. Cargo and mail traffic rose from 648 tons in August, 1959, to 990 tons last month and transatlantic traffic showed a spectacular increase. In August 5,700 passengers travelled on the company's translantic routes—an increase of 46 per cent over the same period last year. During the three months of June, July and August the airline carried almost 326,000 (243,000) passengers on its European routes while 15,900 (10,800) travelled on transatlantic services.

T.W.A. Wins Second Place

Trans World Airlines is now the second largest airline in the world, based upon revenue passenger miles flown in scheduled service, it was announced by T.W.A. in London last week. In the twelve months ended June 30 T.W.A. flew 5,478,329,000 revenue passenger miles over its 50,000 miles of routes in the United State and overseas. Of the total, 4,639,027,000 were domestic and 848,302,000 were international. In first place was American Airlines, with 6,336,152,000 revenue passenger miles. United Air Lines took third place. It was also announced that T.W.A. revenue passenger mileage on international routes increased by 58 per cent in the first eight months of this year.

E.A.A.C. Comets Start

The first Commonwealth airline outside Britain to buy the Comet 4 is to start services with the aircraft this week. The airline is East African Airways. On Saturday, September 17, the inaugural E.A.A.C. Comet 4 service is scheduled to leave London Airport North at 18.30 B.S.T. for Rome, Khartoum, Entebbe and Nairobi, where the aircraft is due to land at 10.05 the next morning. There will be three East African Airways Comet services weekly in each direction between London and Nairobi, one of them continuing to Dar-es-Salaam in Tanganyika. From October 1 another of these three weekly services will be extended to Johannesburg. Later East African Airways, which has two Comet 4s, plans to use this on its Nairobi—Bombay route.

New Services Approved

The Ministry of Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following services:

An inclusive tour service to be operated by Continental Air Transport, Limited, between Cambridge and Nice from September 25, 1960.

An all-freight service by Tradair, Limited, between Southend and Zurich until March, 1967.

An inclusive tour service by Air Safaris, Limited, between London (Gatwick) and Santander from July 22, 1960, until September 27, 1960, and from May 31, 1961, until September 27, 1961.

An inclusive tour service by Tradair, Limited, between Southend and Madrid from July 22, 1960, until October 18, 1960, and from May 16 until October 18, 1961.

An inclusive tour service between London Airport and Rimini by Eagle Aviation, Limited, from July 22, 1960, to October 10, 1960.

An inclusive tour service to be operated by B.K.S. Air Transport, Limited, between Newcastle and/or Leeds/Bradford and Tarbes from July 21, 1960, to October 31, 1960.

B.E.A.'s Turbine Fleet

The re-equipment of B.E.A.'s fleet with British turbine-powered aircraft, which started in 1953 when the Vickers Viscount was placed in regular scheduled service, was, said Lord Douglas, now almost complete, with the result that of the total seat-miles offered for sale by B.E.A. during the current financial year 96 per cent would be turbine aircraft—20 per cent in pure-jet Comet 4Bs and 76 per cent in turboprop Viscounts. "Next year, with the addition of a further three Comets and the introduction of Vanguards, the proportion of our passenger capacity in turbine aircraft will rise to 99 per cent, that in pure jets then being about 25 per cent. Although there are only seven Comets in the fleet, it is interesting that these aircraft are producing during the current year nearly as much passenger capacity as B.E.A.'s entire fleet of over 100 aeroplanes ten years ago."

A SUCCESSFUL AND VIGOROUS INDUSTRY

A Message from the Hon. GEOFFREY ROOTES, President, Society of Motor Manufacturers and Traders

• • • • • •

● The 1960 Commercial Vehicle Show which opens at Earls Court next week will reflect a successful and vigorous industry. Sometimes overshadowed by the more widely publicised motor industry, the commercial vehicle industry has made tremendous strides in the last few years, both in developing its production techniques and new markets overseas.

● The industry is now making and exporting more commercial vehicles than at any time in its history. The truck manufacturers in this country produced 60,000 more vehicles in the first half of this year than during the same period in 1959, and their export figures also showed a healthy increase.

● The truck is now recognised throughout the world as an essential machine tool of industry and the continual expansion of hitherto under-developed countries is emphasising the great potential which still exists for commercial vehicle sales.

● The British industry intends to realise this potential and our truck manufacturers play a great part in the expansion plans already laid down for the motor industry as a whole.

● There is no doubt that the products on show at Earls Court this year will confirm that the British truck is supreme in its field. If we can continue to hold our costs and so remain competitive in world markets, I have no doubt that the industry's achievements in the past can be dwarfed by those of the future.

Geoffrey Rootes.

VEHICLE TESTING

Stations Start Work

PROCEDURE ADOPTED

AS already foreshadowed in our columns the official vehicle testing scheme started on Monday, September 12. It covers cars, motorcycles, taxicabs and goods vehicles up to 30 cwt. unladen weight. At any one of the 12,500 garages or testing stations throughout the country displaying the blue square and three white triangles sign, owners may have their vehicles tested. Thereafter a certificate valid for 12 months is issued to owners whose vehicles pass the test. The tests will not become compulsory for some months—until probably near the end of the year when the Minister of Transport will make an Order specifying a date after which it will be unlawful for ten-year old vehicles to be used on public roads without a valid test certificate.

A visit to the one testing station operated by the Ministry of Transport at Hendon—some 70 are maintained by local authorities—showed that, briefly, the procedure consists of a brake test carried out on a static machine or with a decelerometer followed by a thorough check of the steering gear and lighting equipment. It may be added that further details are contained in a booklet—*The Tester's Manual*—which has been prepared by the Ministry and is available through H.M. Stationery Office (Price 2s. 4d.). The booklet is primarily intended as a guide to testers, but owners of vehicles will also find it helpful, even if the tautological references to "foot pedal" are to be regretted.

Reasonable Standards

The Ministry of Transport states that any vehicle kept in a reasonable state of maintenance should have no difficulty passing the test. As already indicated, the tests will not, at first, be compulsory for any vehicle. The Order may specify different dates by which vehicles of varying ages over ten years will need to be tested. A further interval will be allowed before relicensing of ten-year-old vehicles is made conditional on the production of a current test certificate.

Standards of tests are such that vehicles properly constructed and maintained should qualify for a test certificate. It is not the purpose of the test to "drive off the roads" older vehicles simply because of their age. If they fail the test and are refused a certificate, it will be because they are not roadworthy—in many cases actually unsafe.

Distribution of Testing Stations

Of the 12,500 testing stations now authorised by the Ministry, approximately 1,850 are in the Metropolitan traffic area. There are about 1,500 in the South-Eastern area, and a similar number in the Western area. Testing stations in other areas of Britain number approximately:

North-Western	1,300
East Midlands	1,180
Yorkshire	1,000
West Midlands	970
Eastern	850
Northern	620
Scotland (South)	650
Scotland (North)	550
South Wales	530

The Ministry must be satisfied that motor mechanics, nominated by an authorised examiner to carry out vehicle testing, are competent to do so, and the names of those approved must be displayed in the testing station. The Ministry has been, and is still, running courses of instruction and practical demonstrations in the conduct of these tests for the benefit of examiners, and these have already been attended by more than 10,000 of the mechanics who will be responsible for carrying out or supervising the tests. There are at present instruction centres at Hendon, Glasgow, Newcastle, Bolton and Bristol.

★

FORTHCOMING EVENTS

Until September 19.—Inst. T. Weekend Course. New College, Oxford.
September 18.—S.C.T.S. Bus tour of Southampton and visit to graving dock and locomotive shed.
September 19.—R.C.T.S. (Merseyside). G. O. B. Clark, "Main Line Diesel Locomotives." Woodside Hotel, Birkenhead. 7.30 p.m.
H.M.R.S. T. L. Jones. "Welsh Railways Records." Kean House, Calshot Street, W.1. 7 p.m.
September 20.—I.Loco.E. Presidential address by D. C. Brown, 1 Birdcage Walk, S.W.1. 5.30 p.m.
September 22.—R.C.T.S. (West Riding). George Dow, "Railway Heraldry." Railway Institute, Yorks. 7.15 p.m.
September 23.—R.C.T.S. O. J. Morris, "L.B.S.C.R. Suburban Services." 163 Eversholt Street, N.W.1. 7.15 p.m.
September 23-October 1.—Commercial Motor Show, Earls Court.
September 24.—O.S. Annual dinner. Clarendon Restaurant, Hammersmith, W.6. 7 for 7.30 p.m.
A.F. Annual dinner. Gatwick Airport.
September 25.—V.P.V.S. Vintage bus and coach rally. Red Lion, Hatfield.
September 26.—I.R.S.E. (Bristol). O. S. Nock, "Signalling from the Driver's Point of View." Bristol Temple Meads Station. 6 p.m.
September 29.—Rly.C. Visit to the Archives of the British Transport Commission. 6.45 p.m.
September 30.—I.Nav. Capitaine de Fregate L. Oudet and Captain J. Poll, "The Flow of Maritime Traffic." University of Southampton Navigation School, Warsash. 4 p.m.
B.I.S. Visit to the Bitterley branch by freight train, leaving Ludlow 11.30 a.m.
October 3-7. British Railways Electrification Conference. London.
October 6-16.—International Motor Show (including commercial vehicles). Paris.

Minneapolis—Honeywell Regulator Company, Philadelphia, has concluded an exclusive worldwide licensing agreement with Continental Oil Company, Houston, to manufacture and market a new electro-chemical system for controlling corrosion. The system, developed by Conoco scientists and to be marketed under the trade name of Anotrol, will be offered initially for the control of corrosion in the storage and processing of sulphuric and certain other corrosive acids, as well as corrosive caustics. It is expected to find immediate application in storage tanks, tank cars, trucks, barges and process vessels exposed to such corrosives.

A new 22-min. film in colour on the refinishing of motor vehicles has been produced by Lewis Berger (Great Britain), Limited, supplier of about 25 per cent of motor finishes in this country. The film—"Formula for Finish"—shows stage by stage the repair and refinishing of a damaged vehicle wing using Viton half-hour enamel. This synthetic enamel is claimed to combine the advantages of fast air drying with a glossy high build finish straight from the gun. Also illustrated is the considerable amount of laboratory work essential to the production of the paints. At the Commercial Motor Show the film will be shown to those who write for tickets to the industrial sales manager of the company at Dagenham. It is also planned to show it throughout Britain and copies of the film can be made available for screening to staff canteen audiences.

ALBION DEVELOPMENTS

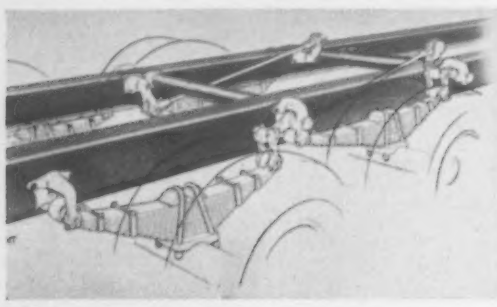
Re-engined Clydesdale and Reiver

FIVE- OR SIX-SPEED GEARBOX FOR CLAYMORE

CHANGES in Albion vehicles for exhibition at the Commercial Motor Show mainly comprise the use of the higher-powered Leyland Power-Plus O400S diesel engine in Clydesdale 9-ton and Reiver three-axle 10-ton chassis, which also has a new bogie, and the substitution of the five-speed constant-mesh gearbox, with optional overdrive sixth, for the earlier four-speed unit of the underfloor-engined Claymore 5-ton chassis. Other changes have been made to the brakes and suspension of the Claymore, while a new resin-glass cab will be fitted to one of two Chieftain 7-ton vehicles on show. The Chieftain is also on public view for the first time fitted with the latest version of the Albion EN335 four-cylinder diesel engine, which has the C.A.V. DPA distributor fuel-injection pump, nitrided crankshaft and strip bearings. A sectional working example of the engine will also appear on the stand.

Introduced first at the 1958 show, the latest version of the Clydesdale is exhibited with a new and more powerful engine. The new diesel is from the Leyland Power-Plus series, designated 400S. A six-cylinder direct-injection four-stroke unit with a capacity of 399 cu. in., it develops a net installed 125 b.h.p. at 2,400 r.p.m. and a maximum torque of 300 lb./ft. at 1,600 r.p.m.

Of generally orthodox design, it has a number of new features including thin-wall porous chrome steel cylinder liners; new radial arrangement of cylinder head studs to equalise stud loading and ensure freedom from thermal distortion; spheroidal combustion chamber giving a high degree of air-fuel mixture; and Simms Mini multi-element fuel-injection pump with mechanical governor used with four-spray injectors.

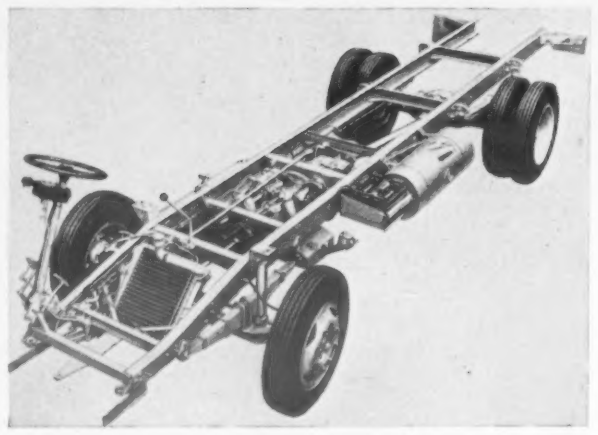


New non-reactive bogie suspension for the Reiver and, right, four-cylinder diesel of 94-b.h.p., with C.A.V. distributor pump, now fitted to Chieftain chassis

The engine is mounted with the well-tried Albion five-speed constant-mesh gearbox and the 14-in. dia. clutch is hydraulically operated through a long-stroke slave cylinder which provides automatic adjustment for wear. Overdrive sixth speed is available optionally. The rear axle is the now well-proved Albion double-reduction unit.

Air-pressure brakes have cam-operated shoes powered by diaphragm brake chambers mounted over the kingpins and on the rear axle casing. Marles cam-and-double-roller steering is used and the chassis has extra-long semi-elliptic springs. The frame members are of high-tensile steel channel section, braced with stay tubes and pressed-steel cross-members bolted in position. The chassis is fitted with the standard Albion pressed-steel cab having easy access by steps forward of the front axle and large curved windscreen.

Mounted on 10.00-20 14-ply tyres, the chassis has a wheelbase of 10 ft. and is equipped with a 4 cu. yd. Ransomes and Rapier concrete agitator, which is powered by a Deri-sine hydraulic pump driven from the front end of the crankshaft. The Clydesdale range is available in six wheelbases to suit bodywork up to 23 ft. 9 in. long and in 7 ft. 6 in. or 8 ft. overall width, designed to operate at a gross vehicle weight of 14 tons solo and 20 tons with semi-trailer.



The underfloor-engined Albion Claymore 5-tonner now has a five-speed or overdrive six-speed gearbox

New Engine And Bogie For Reiver

The Reiver light six-wheel chassis is designed to operate at a gross vehicle weight of 15½ tons; as the chassis and cab weigh just over 4½ tons there is a useful margin for bodywork plus a payload of 10 tons. The range includes three models, available with single- or double-drive rear axles. Two new features embodied in the vehicle displayed are the new Leyland Power-Plus 400S diesel engine, as in the Clydesdale, and a new non-reactive suspension on the rear bogie. The Reiver also employs the Albion five-speed constant-mesh gearbox, with optional overdrive sixth.

The chassis is fitted with a relay gearbox which divides the drive from the main gearbox into two; one output shaft is coupled to the leading bogie axle while the other passes through the leading axle body to the second axle. It incorporates a locking differential controlled from the cab. The rear axles are of the new Albion spiral bevel type with hub reduction gearing.

The new Albion non-reactive rear suspension, which is said completely to overcome the disadvantages associated with rocking-beam bogie suspension, has the front end of each rear spring anchored to the frame. A system of bellcrank levers and tension rods links the rear ends of the springs at each side of the chassis, ensuring that the forces at the rear ends of the springs are equalised at all times. The tendency to lose adhesion, experienced when sufficient torque is applied to the axles, in driving or braking, causing one axle to lift is eliminated. Thus braking is improved and unequal tyre wear remedied.

Improved Claymore

The latest version of the Claymore 5-ton chassis to be shown has a standard three-man cab with easy access and low unobstructed floor line. It is fitted with an aluminium-alloy brewery lorry body, having side stanchions and horizontal snap bar assemblies, the dimensions being 16 ft. 6 in. by 7 ft. 6 in. One of the great advantages of the Claymore is the large body space available on a short-wheelbase chassis, and its ability to manoeuvre easily in confined areas. The exhibit, for instance, has a wheelbase of only 11 ft. 10 in., an overall length of less than 22 ft. and a turning circle of only 46 ft.

An outstanding new feature of the Claymore is the fitting as standard of the Albion five-speed constant-mesh gearbox, which has the additional advantage of allowing a sixth-speed overdrive with a ratio of 0.76 to 1 to be fitted optionally in place of the earlier four-speed box.

Other improved features include the use of a Hydrovac brake servo, with integral vacuum reservoir, and the fitting of road springs with a flatter camber, resulting in a reduction of 1⅛ in. in the laden height. The power unit is the efficient and economical Albion four-cylinder underfloor horizontal diesel engine, with a capacity of 251 cu. in., developing 72 b.h.p., which is mounted amidships between front and rear axles. Front axle, rear axle and other components remain unaltered.

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BUS MAINTENANCE

(*Continued from page 5*)

from diesel engines such as are used in buses and heavy goods vehicles. Some of this publicity has been fair, some unfair, and some irresponsibly alarming. That public service vehicle operators, who were pioneers in the use of the diesel engine, should be included as being responsible for some of these exaggerated claims seems unfair. They first introduced diesel engines into their fleets almost 30 years ago and even in those days, it was appreciated that the public would not tolerate black smoke from exhausts.

Smoke emitted from a diesel engine exhaust is certainly an indication of an inefficient power unit, for smoke means unburnt or partially burnt fuel. The main types of smoke and causes are as follows:

White smoke:
This is caused by incomplete combustion of the fuel when cylinder compressions are too low.

Light grey smoke:
1. Caused by low injection pressure—an excess of fuel being emitted by injectors.
2. Caused by poor compression—due to lubricating oil passing into combustion chamber and mixing with the fuel at combustion—as a result of worn piston rings or cylinders.

Blue smoke:
This appears upon acceleration after idling or after coasting down a gradient—caused by lubricating oil being drawn in by suction through worn valve guides. Caused also by poor compression, due to worn piston rings and cylinders.

Greyish black smoke:
Caused by low injection pressure resulting in passing of excess fuel through the injector.

Dense black smoke:
Caused by over-calibration of the fuel injector pump and can be seen usually when vehicles are negotiating long hills or operating under heavy load conditions.

DAIMLER FLEETLINE

(*Continued from page 6*)

Pneustrip treads and nosings. A luggage recess is incorporated in the stair structure. A conductor's locker is incorporated under the front offside seat in the upper saloon accessible from the staircase.

The seat frames are Peters Dapta tubular type, with stainless steel double top rails. Seat cushion fillings are of Dunlopillo and the squabs of polyester foam upholstered in Vynide and Vynair.

Destination and route number gears of Equipment and Engineering Eco heavy-duty type, with destination and triple route number at the front and triple route number at the rear.

The ceiling panels and window finishers are stove enamelled and the bodyside lining panels are covered with Vynide. The front-end lining panels from floor to waist in upper and lower saloon are of chequered aluminium alloy. All staircase handrails, stanchions, guard rails and so on are of stainless steel.

There are 14 recessed open-reflector lamp fittings in the upper saloon and ten in the lower saloon, with an additional one above the platform. Cronopress bell strip is fitted to ceilings in both saloons, positioned to the nearside of the gangway. One Bonella bellpush is fitted above the luggage compartment. A Clayton Dewandre heater-demister is fitted in the driving compartment and there are two same-make heaters, one recirculatory and one fresh-air, in each saloon. Batteries are housed under lower-saloon seats.

MORE ABOUT THE NEW LEYLANDS

*Heavy-Duty Range and Rear-Engined Single-Decker—2**

THE electrical system employs 24-volt lighting and starting circuits and dynamo regulation is by compensated voltage control. The dynamo output is 360 watts. A high-capacity 5-in. starter motor is flange mounted to the flywheel housing. Batteries are of the lead-acid type and have a capacity of 121 amp.-hr. at 10-hr. rating. A comprehensive selection of instruments is grouped in a detachable panel with concealed rheostat-controlled lighting. Included in the instruments are oil and air pressure gauges, water temperature indicator, ammeter and a push-button instant-reading engine oil-level gauge, all graduated in both English and metric units. A removable key controls the auxiliary circuits and pilot lights.

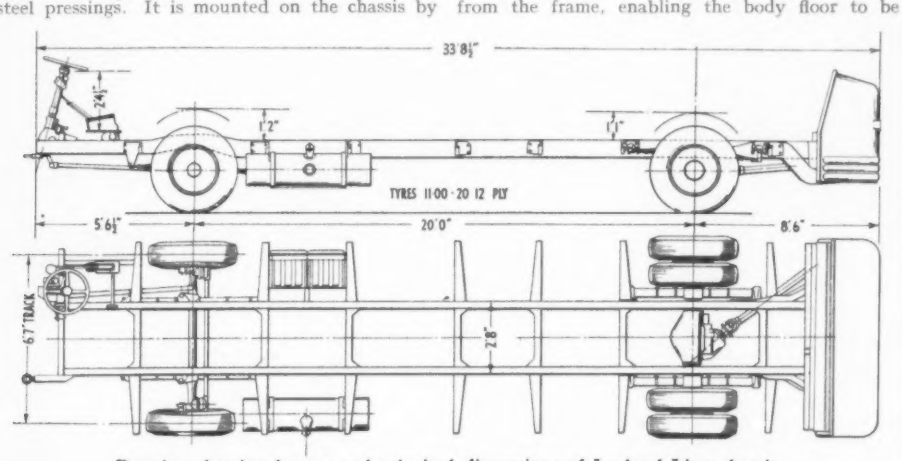
Driver comfort has been one of the principal aims in the design. A major contribution is made by a new Vista-Vue pressed-steel cab, which also has a resin-glass counterpart. Both have identical styling generally similar to the type already familiar on Albion vehicles, but with an additional low step below door level ahead of the front wheel. Both cabs have successfully withstood gruelling tests on the rough tracks of the Motor Industry Research Association proving ground.

The steel cab, which is the standard fitment, is of double-skin construction, with glass fibre insulation, built on a steel subframe of welded box sections incorporating rigid door frames of single steel pressings. It is mounted on the chassis by removable subframe bolted across the rear of the chassis frame; unlike the Atlantean, the Lion has a flat-topped chassis frame which broadly follows the design of the Worldmaster underfloor-engined chassis, of which more than £20 million worth have already been sold abroad. A revolutionary air-filtration system offered as optional equipment on the Lion has been devised after on-the-spot investigations abroad in countries where the worst type of dust-laden conditions are found.

Air is drawn in at the front of the vehicle at roof level, relatively dust-free, and is ducted to the rear through a hollow roof formation. Heavy dust particles are separated from the main stream of air by this action and fall clear of the vehicle to the rear, while the air enters a multi-element cyclone filter made up of over 300 individual units which precipitate the finer dust particles into an underslung hopper. Only clean air enters the engine compartment. The design of the filtration system lends itself to integration with many designs of coach bodywork. The hopper under the vehicle can be emptied easily and quickly at necessary intervals.

Double-Thickness Frame

The chassis frame is of double thickness from the extreme rear end to a point just behind the rear of the front springs. Seven pairs of outriggers extend from the frame, enabling the body floor to be



Drawing showing layout and principal dimensions of Leyland Lion chassis

flexible rubber mountings which absorb vibration and frame flexing. A step height from the ground of only 20 in. has been achieved with the design.

The wrap-round windscreen gives maximum forward visibility and is made from ¼-in. toughened plate glass with a total glazing area of approximately 3,000 sq. in. Housed above the windscreen head rail is the motor for the two rainbow-type windscreen wiper blades.

Cab Fittings

Running the full width of the cab below the windscreen is the facia panel, which houses the instrument panel in the centre and incorporates a glove compartment on each side. Four demister nozzles are fitted, together with the necessary flexible hose, enabling a heater and demister unit to be fitted during production of the cab or by the customer afterwards. The roof has insulation from the windscreen headrail to the rear bulkhead cant rail, and the rear bulkhead is fitted with an interior lining panel from the cant rail down to the waist rail. Glass fibre matting is fitted in the interspace of the roof. Three large windows of $\frac{3}{16}$-in. toughened glass are fitted in the rear bulkhead.

One of the features of the steel cabs is a thick undersealing with rubberised solution. All the underparts of the structure, including the wings, are coated during manufacture, when the cab can be positioned in the most effective manner for this treatment. The interior of the door panels, also normally vulnerable to corrosion, are similarly treated.

With glass fibre-reinforced plastics mouldings replacing sheet-steel pressings, the low-weight Vista-Vue cab offered as an alternative yields a saving in weight of approximately 2 cwt. It is identical in appearance with the steel cab and all fitments and features of internal trim are common to both. It is built on a similar strong subframe incorporating steel door frames pressed from a single sheet. High impact strength, high resistance to all forms of corrosive attack and excellent insulation properties are features of the plastics panels, while structural repairs can be quickly and easily executed.

Practically every chassis component on the new vehicles will also be specially treated to resist corrosion in a new pretreatment plant which Leyland opened in March of this year. The plant is a new feature in the heavy-vehicle industry and is remarkable for the number of components which it treats. All cast-iron and malleable cast-iron components are shot-blasted, painted and force-dried. Steel components such as crossmembers, flitches, bumpers and so on are degreased, given a rust-inhibiting coat of iron phosphate and painted.

Lion Rear-Engined Passenger Chassis

The Lion rear-engined passenger chassis to be exhibited has been built specially for high-speed coaching in the United States of America. At the end of the show it will be shipped to Highway Products, Inc., Ohio, which, as we recorded in our issue dated July 9, has ordered 60 similar chassis. Fitted with the new Power-Plus O680 diesel engine, which develops 200 b.h.p. (net) at 2,200 r.p.m., and a complementary Pneumo-Cyclic gearbox, it is capable of sustained speeds well up in the seventies. In fact, it is the forerunner of a new Lion range designed for export, which in standard form will take the Power-Plus O600 engine of 140 b.h.p., the high-powered unit being available optionally. It is offered with both left- and right-hand control and a 20-ft. wheelbase is suitable for bodies 34 ft. long.

As in the case of the now well-established Atlantean double-decker, the vertical engine-transmission-radiator unit is carried in a quickly mounted directly on them. Standard suspension consists of leaf springs, but air suspension is available for the front axle in the form of double convolution air bellows, located by light steel spring leaves. Two large air reservoirs act as a pneumatic buffer and a levelling valve with variable delay gives constant frame height at the front under all conditions of load.

By mounting the engine at the rear, the centre portion of the chassis below the frame is completely clear. This, coupled with a frame height of 34 in., provides a high ground clearance between the wheels enabling the vehicle to travel over really rough roads. For long-distance coach work over good roads, the space below the frame between the wheelbase can be used for luggage.

Automatic Transmission

Power from the engine is transmitted to a Leyland four-speed Pneumo-Cyclic gearbox through an automatic centrifugal clutch. The gearbox can be offered with automatic or semi-automatic control. Final drive is through an angle drive box and a short open propeller shaft to the spiral-bevel rear axle. Much attention has been paid to the power-unit mounting in order to obtain the greatest advantage from siting the unit remote from the passenger compartment. Silence, smoothness and freedom from vibration characterise the whole installation, which is carried on sandwich and cone-shaped rubber mountings.

Automatic chassis lubrication is fitted as standard. The front axle is a forged-steel H-section beam with wheel hubs mounted on taper-roller bearings. The steering gear is of the worm-and-nut type mounted on the extreme front crossmember. The steering ratio allows 7½ turns lock to lock, and the turning circle of the vehicle is approximately 78 ft. (23.8 m.). Air-pressure braking embodies a two-cylinder engine-driven compressor, a D1 valve, diaphragm brake chambers, Bendix-Westinghouse slack adjusters and S-profile cams.

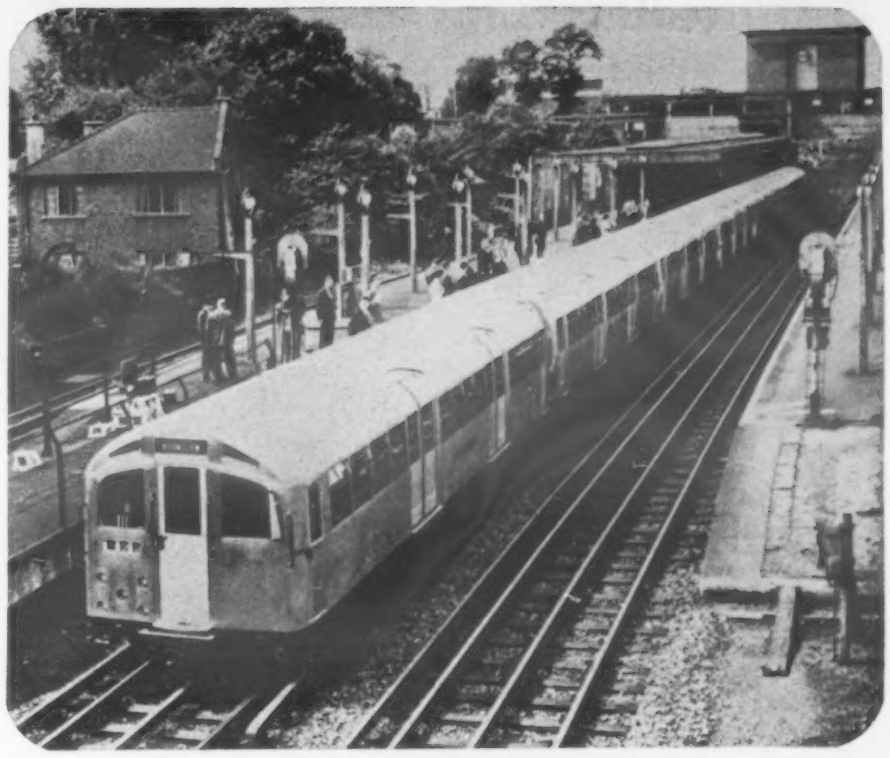
The electrical equipment comprises 24-volt lighting and starting circuits, a 55-amp. dynamo of 1,320 watts output, an axial starter motor and batteries of 148 amp.-hr. capacity. The headlamps and foglamp have been matched to the high performance potential of the vehicle. Twin Windtone horns are fitted as standard equipment.

Power-Plus Super Comet

The Super Comet range, for 14 tons gross weight solo and 20 tons with trailer, remains virtually unchanged, except for the more-powerful engine. The new power unit is the Power-Plus O400S, features of which are unusually large bearing diameters, Simms Minipump fuel-injection pump, porous-chrome cylinder liners, a built-in gear drive for a hydraulic pump for powering an optional steering servo and the new Leyland Spheroidal direct-injection combustion chamber. Transmission is through a standard five-speed constant-mesh gearbox, available optionally with additional overdrive and a single-speed double-reduction rear axle or optional two-speed unit.

Tests of a Super Comet with the new engine, which develops 125 b.h.p. at 2,400 r.p.m. and 300 lb./ft. torque at 1,600 r.p.m., and fitted with a 5.04 to 1 axle and overdrive six-speed gearbox, are said to have proved a top speed of 75 m.p.h. under motorway conditions. Maximum road speeds with a full load were 8½ m.p.h. in first, 13½ m.p.h. in second, 21½ m.p.h. in third, 35½ m.p.h. in fourth and 57 m.p.h. in fifth, while acceleration was considerably better than with the earlier Super Comet. Loaded to 13 tons 19¾ cwt., the vehicle has been showing fuel consumptions ranging from 12 m.p.g. over a twisting hilly route to 17.5 m.p.g. over a normal trunk road. Empty fuel consumption was as high as 25.9 m.p.g.

* The first part appeared September 10.



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MANCHESTER-CREWE ELECTRIFICATION

Minister of Transport Declares Service Open

SPEAKING at the inauguration ceremony of the Manchester—Crewe main-line electrified services on the station concourse at Manchester Piccadilly (the erstwhile London Road), Mr. Ernest Marples, Minister of Transport, said that in March the Prime Minister had said "the life and trade of the nation require a railway system." What he meant was a system of the right shape, size and pattern. What served us well in the 19th century would not do in the third quarter of the 20th.

Railways Vital

"One thing is quite clear," said Mr. Marples, "in this crowded island we need the massive contribution of the railways. It is wishful thinking to expect the commuting population of our vast conurbations to be moved by individual private motor cars. In London 6 per cent enter by private car and 94 per cent by public transport. It would be physically impossible to cope without the railways." But, of course, the British Transport Commission was absolutely right to alter quickly the methods of traction. Steam was on the way out and the quicker it was out the better. Electrification and diesels were in and the quicker they were in the better.

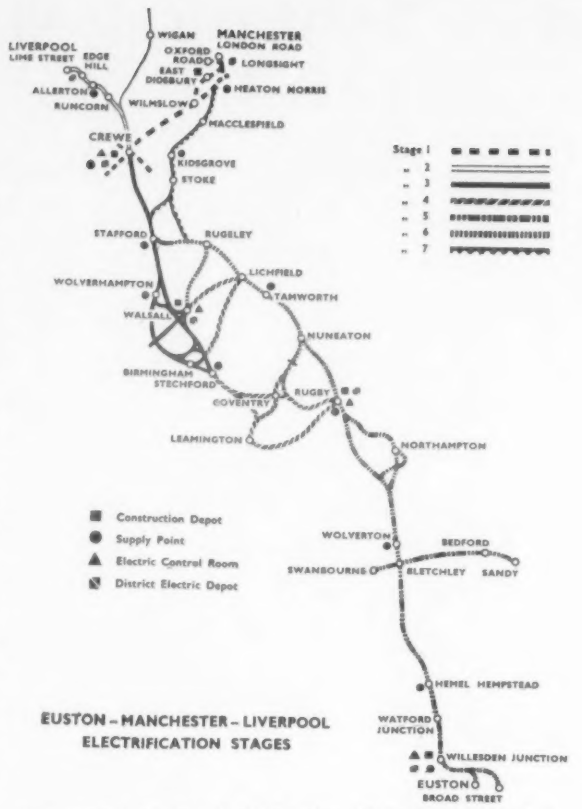
Technically the Manchester—Crewe section had involved major engineering work. The entire track had been relaid on deep ballast; 82 bridges had been altered. The Commission's technical staff was to be complimented on a fine technical performance carried out with skill and devotion. "But we must not forget," added the Minister, "that railways all over the world face formidable competition from road transport. In the mid-1960s we shall have a network of trunk roads and motorways which will give greater flexibility, speed and mobility to road transport. The railways will have to meet that competition with determination, commercial skill, financial judgment and technical shrewdness. The Government will do all it can to make it possible for the railways to play their part."

Inaugural Luncheon

At a subsequent luncheon to civic dignitaries of the area concerned, Sir Reginald Wilson, chairman of the London Midland Area Board, presided. In welcoming the guests, who included Alderman Arthur Donovan, Lord Mayor of Manchester, Mr. Ernest Marples, Minister of Transport, and Sir Brian Robertson, chairman, B.T.C., Sir Reginald thanked the public for its forebearance during the period the line was being reconstructed for electric traction; ultimately the public provided the money for the job and he thought it better purposefully to spend money on remunerative electrification projects rather than let it dribble away through the sands of subsidy. The social benefits were many, although he felt he must remind a Manchester audience of John Bright's dictum that railways had done more for people and received less praise than any other institution. They had an arterial route from the centre of Manchester to the southern and south western suburbs which held the promise of lessening future congestion in the heart of the city. Above all, it was an economic project from the railway point of view. The true cost was reduced by one-third or more over steam traction. He concluded with a tribute to the energy of the Minister.

Mr. Ernest Marples, responding to the toast, said it was a great day for Manchester. He emphasised that it was not the intention of the Government to wreck the railways—"it is our wish to help them in every possible way. I come from the oldest nationalised industry of all—the Post Office. In the Post Office I did not have the help I now have—an advisory committee of 50 million people. There must be railways—we cannot physically do without them. But we want to get their finances, size and shape suitable to modern conditions." Los Angeles was a city which had endeavoured to use private car transport almost exclusively; as a result it spread over an enormous area and two-thirds of the centre was devoted to garages and roads, with acres spent on their junctions. Now movement problems were to be mitigated by building an electric rapid-transit system. Another town traffic problem centred on the long-term parker; he hoped they would get on with their parking meter scheme in Manchester.

One of the G.E.C.-North British 25,000-volt 50-cycle locomotives on a train. The A.E.I. and English Electric groups have also been responsible for locomotive and rolling stock equipment



The original staging of the London Midland electrification scheme

Civil Engineering

Virtually a new railway, resignalled throughout, has been provided over 44 route-miles and 217 track-miles. Track improvement work was undertaken to provide a track suitable for the higher speeds of electrified operation which required raising the maximum permissible speed from 75 m.p.h. to 90 m.p.h. Track layouts have been remodelled to provide easier curvature. In all 144 single-track miles of lifting, reballasting and formation renewing were carried out, and some 330,000 tons of new ballast together with 35 miles of new drainage were laid.

The lines between Slade Lane Junction and London Road (now Piccadilly) were transposed to permit more efficient and more frequent operating into and out of the station. To accomplish this immense task in one weekend, the only time that London Road Station was closed entirely to traffic, called for the most detailed planning and prefabrication of track layouts. Then, some 360 men and five cranes worked right round the clock from Friday to Monday and, despite fog and rain, the job was completed on time.

Bridges and Tunnels

Of 92 bridges, 82 required alteration. The task of bridge raising to give clearance for 25,000-volt conductor lines was achieved by casting a new concrete arch over the arch of the bridge; when this was completed the old arch was dropped by means of explosive charges—a swift and relatively inexpensive technique. For underbridges reconstruction necessitated the cutting away of the old iron structures and their replacement with concrete beams, to ensure less future maintenance. These beams were prefabricated on the site and rolled into position on ball bearing tracks during weekend possessions. At Stockport there was the problem of three tunnels which had to be opened out to provide the necessary overhead clearance. Two new bridges, one of which incorporates a large road traffic roundabout, replace the tunnels, over a century old.

Once the track was completed the final task of the civil engineer was the reconstruction and modification of the stations. Two, Longsight and Heaton Norris, to be closed for passenger traffic, were demolished completely; and the remaining 19 have all received modernisation treatment from the architect and the engineer. Manchester Oxford Road and Manchester Piccadilly, as well as the buildings at Crewe, have been reconstructed. Additional platforms have been provided and existing ones straightened and lengthened. The track

(*Continued on page* 24)

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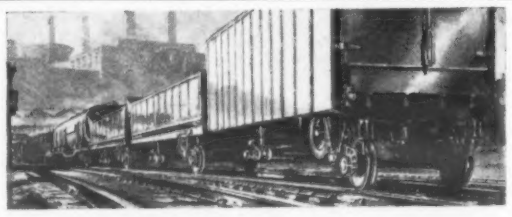

The Roadrailer, made by the Pressed Steel Company, is a door-to-door form of freight carrier completely new to Britain. It is a combined road/rail vehicle with road wheels and rail wheels which can be interchanged in moments. It has its own traction unit, so that you can use it on the road as a van, or as a tanker, a tipper, or a flat truck with detachable sides. Put its rail wheels down, and it can become part of a freight train.

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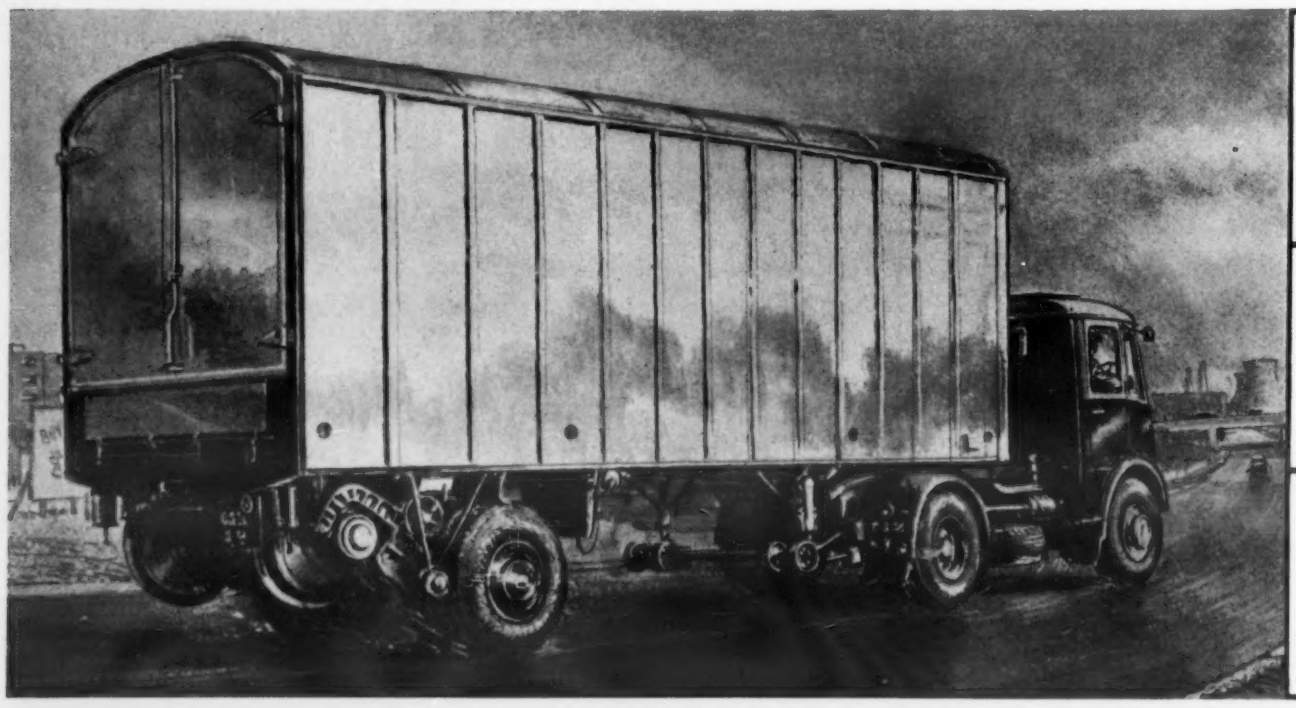

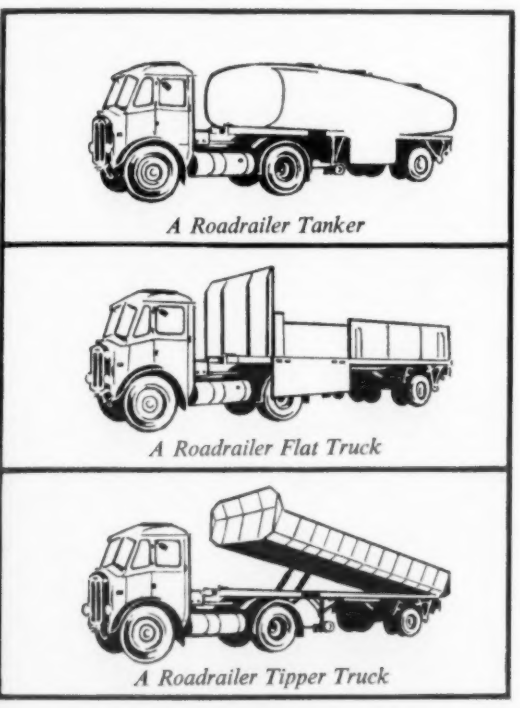

A Roadrailer Tanker

A Roadrailer Flat Truck

A Roadrailer Tipper Truck

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THORNYCROFT HEAVY-DUTY TIPPER

Four-by-Four for 23 Tons Gross

UPRATED Q6 AND K6 DIESELS

IMPLEMENTATION of the intention of Transport Equipment (Thornycroft), Limited, to expand activity in the maximum-capacity and specialised commercial vehicle fields, declared by Sir John E. Thornycroft, chairman of the parent company, in his last annual report, is apparent in the Thornycroft exhibits to be presented at the Commercial Motor Show next week. A completely new vehicle on the stand will be a two-axle tipper or dumper chassis designed for heavy-duty off-road service at a gross weight of up to 23 long tons, depending on tyre equipment. Other developments illustrated will be uprated versions of the well-established Thornycroft 9.83-litre and 11.33-litre diesel engines, the smaller of which will be seen installed in both the new tipper and in the latest version of the successful Trusty maximum-weight eight-wheeler.

The new units will be accompanied on the stand by two versions of the high-performance Mastiff, an MH Express Freighter six-by-two chassis fitted with the latest four-headlamp resin-glass cab and works-built 24-ft. light-alloy body and a four-by-two articulated tractor fitted with Taskers 36-in. fifth-wheel coupling, both for 20 tons gross at home.

Massive Antar Sandmaster

There will also be two examples of Thornycroft vehicles developed specifically for oilfield work in North Africa and the Middle East —a bonneted Trusty six-by-two chassis for 49,200 lb. gross solo, fitted with special 16.00-20 sand tyres, and (what is virtually also a new vehicle, one of a number under construction for Esso Petroleum Company) an Antar Sandmaster six-by-four articulated tractor incorporating Rolls-Royce 300-b.h.p. turbocharged diesel engine, Self-Changing Gears fluid coupling and eight-speed semi-automatic gearbox and double-reduction (overhead worm and epicyclic) driving axles. Notable features of the Antar Sandmaster, which is designed for up to 172,000 lb. gross combined weight, are massive 21.00-25 Atlas sand tyres, a Thornycroft plastics cab, a 750-Imp.

The new Thornycroft medium tipper or dumper chassis for up to 23 tons gross

One of the Atlas 21.00-25 tyres of the Antar Sandmaster compared with a normal 7.00-20 Dunlop Highway

gal. (900 U.S. gal.) service fuel tank for wide range and a tubular front bumper formed into a 16-gal. water tank complete with draw-off cock.

Quite appreciable improvements have been made in the power output of the QR6 600 cu. in. (9.83-litre) diesel, which now produces 150 b.h.p. net (170 b.h.p. max.) at 2,200 r.p.m. and 450 lb./ft. torque at 1,200 r.p.m. under the new designation net torque of 625 lb./ft. at 1,000 r.p.m. It will be recalled that the Thornycroft KRN6S engine was the first, and for several years the only, British production turbocharged automotive diesel. Many have been in service overseas in the company's Big Ben range of vehicles for five years or more. One of its notable features is a high torque output extending from quite low crankshaft speeds ideal for automotive purposes, which is not a strong point of many turbocharged diesel engines.

Versatile Dumper Specification

The new Thornycroft heavy-duty two-axle tipper-dumper chassis has been developed with a close eye on operating conditions and operator's requirements in this field and the design has arrived at a vehicle having maximum versatility in application, to give long trouble-free service with a minimum of maintenance. The design embodies good power-weight ratio; short wheelbase and power steering for ease of handling; driven or non-driven front axle; alternative tyre equipment; separately mounted gearbox of exceptionally robust design; independent front-drive engagement in any gear; full-power power takeoff; double-reduction axles to reduce strain on axle gears and shafts; robust welded frame structure; and a frame capable of taking a wide variety of body types.

As an example of the attention paid to ease of maintenance, the half-cab is designed to provide exceptionally good engine accessibility. For major attention, the front nearside structure has been made quickly detachable, when the engine can be lifted out with ordinary overhead tackle. The separately mounted gearbox can be removed quickly without disturbing the engine or clutch and the clutch can be serviced without disturbing the gearbox. The power steering component is also self-contained and readily detachable.

Uprated Engine

The power unit is the uprated Q6 direct-injection diesel having six cylinders of 4.75 in. (120.6 mm.) bore and 5.65 in. (153.5 mm.) stroke and a capacity of 600 cu. in. (9.83 litres). Its maximum output under the S.M.M.T. test code is 170 b.h.p. at 2,200 r.p.m., while the net installed output is 150 b.h.p. at 2,200 r.p.m. and 450 lb./ft. torque at 1,200 r.p.m. The crankcase-cylinder block is an iron casting, generously ribbed and flanged for rigidity, and fitted with replaceable dry-type cylinder liners. There are two cast-iron cylinder heads, each covering three cylinders, housing the valves, which are operated by pushrods and adjustable rockers by a chilled cast-iron camshaft running in seven bearings. Five-ring aluminium-alloy pistons have a chromium-plated top compression ring and fully floating gudgeon pins secured by circlips. The connecting rods are polished alloy-steel stampings with steel-backed copper lead-lined big-end bearings and seven main bearings of similar type support the nitrided forged alloy-steel crankshaft, which is fully balanced and fitted with a viscous-fluid vibration damper.

The camshaft, fuel-injection pump and a twin-cylinder water-cooled air compressor are all gear driven, while a separate train of gears drives the lubricating oil pump and a hydraulic pump for the steering servo. The dynamo and water pump are driven by double Vee belts. The fuel-injection system embodies a C.A.V. in-line pump with mechanical governor, supplied by lift pump from a 50-gal. tank through paper-element filters, and multi-hole injectors. The cooling system employs a large-capacity centrifugal pump, a balanced valve thermostat and an 18-in. fan driven at 1½ times engine speed. Two full-flow lubricating oil filters are fitted and the standard large-capacity dry-type air cleaner can be supplemented by cyclone-type

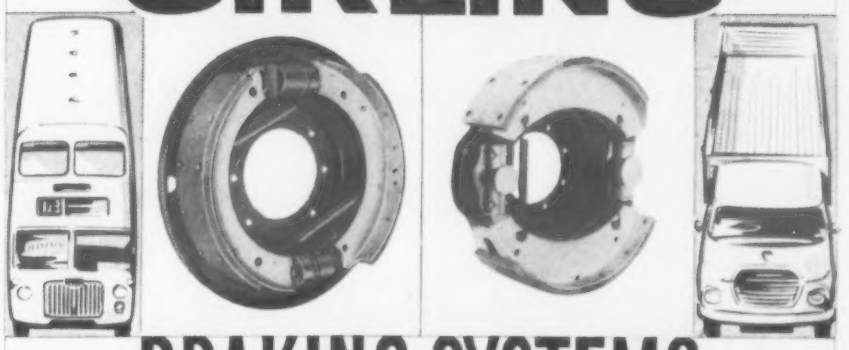
(*Continued on page* 18)

A Big Ben Sandmaster chassis with self-loading body and typical oilfields load

Q6, compared with 130 b.h.p. net and 430 lb./ft. torque of the QR6. The KRN6 11.33-litre engine also has been subject to some redesign work and now appears as the K6 with all gear drives for the auxiliaries, except the fan, which is driven by double Vee-belt with jockey tensioner to enable a close-fitting fan cowl to be used and with net output increased slightly to 162 b.h.p. at 1,900 r.p.m. and a maximum torque of 520 lb./ft. at 1,000 r.p.m.

The same basic engine in turbocharged form, designated K6S, has had its gross output rating increased to 230 b.h.p. at 1,900 r.p.m., with a net installed traction output of 200 b.h.p., and a

GIRLING



BRAKING SYSTEMS

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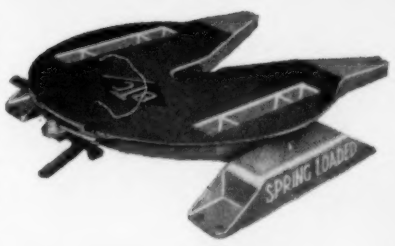

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BRISTOL

Thornycroft Heavy-Duty Tipper

(Continued from page 17)

precleaner at extra cost. The engine and 16-in. Borg and Beck single dryplate clutch, which has mechanical withdrawal linkage, are carried in three-point flexible mountings.

Combined Main and Transfer Gearbox

The combined main and transfer gearbox is a notable piece of design work, having achieved a five-speed constant-mesh gearbox with extra-wide gears to permit continuous running in any gear, front-wheel drive engagement, two output flanges and full-torque and alternative power takeoffs in one compact casing. The unit is independently mounted in the chassis midway between the two axles. It provides forward ratios of 7.759, 5.122, 3.047, 1.746 and 1 to 1 forward and 7.66 to 1 reverse. Engagement of front-wheel drive is by sliding dog and operation is by air pressure, with a warning light in the cab to indicate engagement. The main power takeoff is fitted on top of the gearbox, while alternative drives can be fitted on an S.A.E. facing on the side.

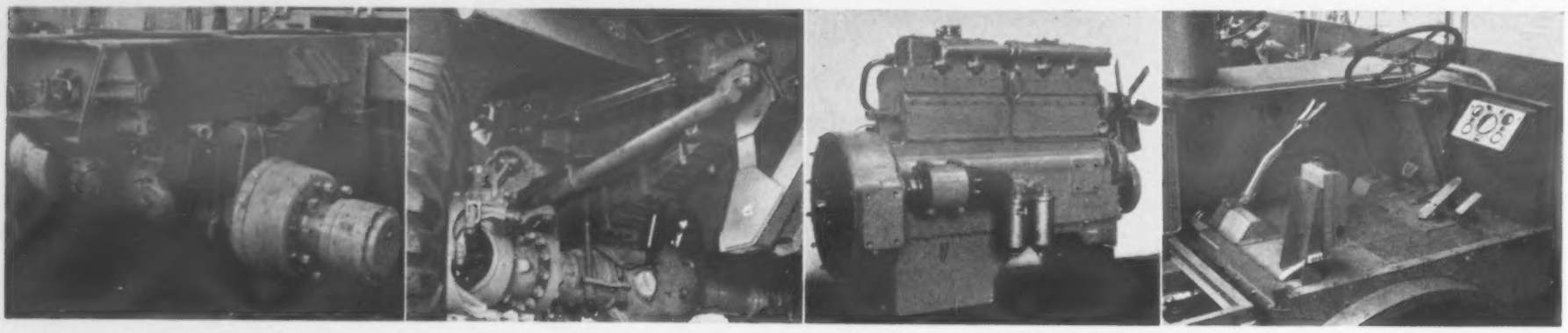
Propeller shafts between clutch and gearbox and gearbox and axles are Hardy Spicer open tubular units with sliding joints and needle-roller-bearing universal couplings. The rear axle is an extra-heavy-duty type having a primary spiral bevel gear with 3.9 to 1 ratio and a secondary epicyclic gear in the hubs with a ratio of 2.947 to 1, giving an overall ratio of 11.49 to 1. The driven front axle is a similar double-reduction unit with a primary ratio of 3.3 to 1 and a secondary ratio of 3.5 to 1, giving an overall reduction of 11.35 to 1. The steering heads swivel on taper roller bearings and the halfshaft universal joints are of the constant-velocity type. The alternative undriven front axle is an I-section beam. The steering employs Marles cam-and-double-roller gear, with hydraulic power assistance, and gives a turning circle of 49 ft.

An exceptionally robust frame is formed of 15 in. by 4-in. rolled-steel channel sidemembers and welded stiffeners and crossmembers, except the front crossmember, which is bolted in position. Suspension is by four low-stress semi-elliptic springs, with shot-peened leaves and chromium-plated shackle pins, having helper springs at the rear and telescopic dampers at the front. Drum brakes, 19 in. by 7 in. at the rear and 17 in. by 4 in. at the front are air-pressure operated, with diaphragm actuators for the rear and piston actuators at the front. The system includes two air reservoirs, one serving all brakes through the pedal valve and the other also serving all brakes through a hand valve on the steering column. This additional means of operating the brakes is not only a valuable safety feature in the event of loss of air pressure, but forms a positive method of holding the vehicle with all the brakes on at the edge of a tip, avoiding the necessity for the driver trying to use the brake pedal and the throttle together while tipping. A normal handbrake of the multi-pull ratchet type mechanically linked to the rear brakes is fitted.

Four-piece wheels 8.37 by 24 in., twins at the rear, take either 12.00-24 16-ply rating tyres for 44,800 lb. (20,230 kg.) gross weight, or 13.00-24 18-ply rating tyres for 51,000 lb. (23,460 kg.) gross weight. An alternative arrangement offers 18.00-25 single tyres, when rear springs are not fitted. Standard equipment includes 24-volt electrical system, incorporating six-lamp lighting, with all lamps well protected, full illuminated instrument panel, cab base and towing jaw at front and hook at rear. Optional or alternative fittings include gearbox side power takeoff, metal half cab, cab heater, spare wheels and tyres and cyclone type air precleaners.

Leading Dimensions

Principal dimensions are wheelbase 10 ft., rear of cab to rear of frame 11 ft. 0½ in., overall length 16 ft. 8¾ in., overall width over tyres 9 ft. 0⅞ in., frame height laden (12.00 tyres) 4 ft. 3¾ in., height to top of cab laden 9 ft. 11⅜ in. and ground clearance under rear axle 1 ft. 2 in. Maximum speeds with 12.00 tyres, allowing for 8 per cent governor run-up are first 4 m.p.h., second 5½ m.p.h., third 9½ m.p.h., fourth 16½ m.p.h. and top 29 m.p.h. On 13.00 tyres all speeds are 4 per cent higher. Weight of the four-by-two chassis and cab, on 12.00-24 tyres, ready for service, is 17,140 lb. (7,780 kg.), leaving a margin of 27,660 lb. (12,540 kg.) for body and payload. On 13.00-24 tyres, when the higher maximum gross weight is permitted, the body and payload margin is 34,000 lb. (15,490 kg.). The driven front axle in each case adds 840 lb. (380 kg.) to the tare and reduces the payload accordingly.



Features of the new medium tipper-dumper: rear axle showing robust spring shackles and bolted-on brackets; front axle (from behind) showing constant velocity joints, brake cylinders and hydraulic steering servo; new Q6 9.83-litre diesel giving 150 net b.h.p. and 450 lb./ft. torque; base of the half-cab showing instrument panel and additional air brake control for safer dumping

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DAVEY, PAXMAN DIESELS

At Bergen Fishing Exhibition

AT the annual Bergen Fishing Exhibition, the larger Ruston group exhibits on the Kolberg and Sanne stand will be from the range of diesels built by Davey, Paxman, Limited, Colchester. Two Paxman engines are on show, a six-cylinder 7-in. bore marine diesel fitted with 3:1 Self-Changing Gears unit for a controllable pitch propeller and an eight-cylinder normally aspirated version of the company's new air-cooled diesel, the Vega. The air-cooled engine, which is already in marine service, is rated at 310 b.h.p. at 2,100 r.p.m. Compactness and high power-weight ratio should suit craft requiring a small powerful motor.

The six cylinder water-cooled exhibit, rated at 229 s.h.p., popular in small craft and widely used by Seine netters, has a good power-to-weight ratio and high reliability record. Ruston and Hornsby, Limited, Lincoln, is exhibiting three units representative of its Y range of air-cooled marine diesels with powers of 4 to 114 s.h.p.

NEW FLEXIBLE COUPLING

Simple-To-Fit Quadriflex

CLAIMED to be exclusive, a new type of flexible shaft coupling introduced by R. and J. Dick, Limited, Greenhead Works, Glasgow, S.E., is said to provide dependable power and withstand all types of misalignment and end float. The coupling, named Quadriflex, is designed to provide quiet operation and exceptional torsional flexibility —15 deg. at peak torque compared to 1 to 3 deg. for other types—and abiiity to absorb vibration and shock, thus resulting in smoother operation for both driving and driven equipment. The coupling consists of two flanges and a two-piece flexible rubber sleeve. Teeth on the sleeve halves lock into teeth in the flanges without clamps or screws and tighten under torque.

As the name implies, the Quadriflex coupling is designed to provide all the four degrees of flexibility; angular misalignment up to 1 deg., parallel misalignment up to $\frac{1}{16}$ in., free end float up to $\frac{1}{4}$ in. and torsional load. Installation is simple. Flanges are slid on to the shafts and one is fastened in place, the two-piece coupling is inserted and the other flange positioned and locked. A retaining ring is supplied for high-speed operation.

WELDING-CUTTING OUTFIT

Economical Gas Consumption

COMBINED welding and cutting equipment named Economatic, introduced by British Industrial Gases, Limited, is designed to give substantial economies in gas consumption. After lighting in the normal way, the welding flame is obtained simply by pressing a thumb lever which, when released, reduces the flame to a pilot light. A non-automatic version of the torch is also available. A feature of the equipment is that by unscrewing the mixer assembly and replacing it with a cutting head, the blowpipe is converted to a cutting torch. Economatic is manufactured by British Industrial Gases by arrangement with Harris Calorific Company, Ohio.

The British company has also introduced an improved version of the Cub profile cutting machine, the Mk. II version of which incorporates several refinements. Chief of these is what has been named Cutomation—a system for profile machines which is cheaper to run, faster and more efficient than any previous method. The faster speeds are due to the fact that the cutting oxygen stream expands within the nozzle, whereas such expansion normally takes place as the oxygen leaves the torch. In the new nozzle the oxygen flows at supersonic speed and oxidises the metal in the form of a narrower kerf. Using propane as the fuel gas a high-quality cut is ensured and less slack is formed at the bottom of the cut. Of the dual carriage type, the Cub uses oxygen in conjunction with any fuel gas and can be fitted with twin heads.

REROUTEING OF A TOWN BUS SYSTEM

Drastic Remedy for Recurrent Ills

*By N. McDONALD, M.Inst.T., General Manager, Warrington Corporation Transport Department**

THE subject of this paper arises from recent experience in my own undertaking where we have been taking strong, if somewhat unusual, measures in an attempt to tackle a heavy deficit. It has been suggested that some of the features of these measures might be of wider interest. It is not my intention to weary you with a lot of local detail regarding Warrington and I confine myself to an explanation of the basic principles involved in what has been called the "Warrington Experiment." This paper is no more than an attempt to describe the fundamental principles on which the rerouteing scheme was based.

Annual estimates forecast a deficit for the coming year, 1959-60, of £34,000. Our traffic had diminished in the nine years from 1950 by the frightening amount of 30 per cent, from 39,835,278 passengers in 1949-50 to 27,528,830 in 1958-59. There were special local reasons for this over and above the national trend of decline, in the closure of the many military establishments centred in the area. Vigorous counteraction had been taken by repeated fare increases, substantial reductions in mileage and many internal economies, but the decline continued. Despite every orthodox measure taken, the situation continued to deteriorate.

It seemed to me that whether fares were reasonable or not, or whether an increase was justifiable or not, was not really the problem. The problem was that reasonable and justifiable though they were, the public just wouldn't pay them. Nor was I enamoured of further reductions in frequencies because the only routes with any substantial potential were the most remunerative ones and to attack these would be cutting the ground from under our feet. Experience had also shown that future years would probably bring further increases in costs and there was a lot to be said for trying to intersperse something else in the round of fares increases or service cuts.

The General Approach

The rerouteing scheme is the result of ideas which have been forming in my mind over a number of years and certainly not solely arising from circumstances in my present undertaking. Rather was it that I had the opportunity to put into practice some of the things which have been at the back of my mind over a period of years. I think it helpful to consider just for a moment the development of routes. It makes an interesting study to find the original pattern and to note the developments which have taken place by way of extensions, deviations and introduction of new routes. It is also interesting to pay particular attention to the shape of the routes as they have finally emerged and to contrast these shapes with the original pattern. In many cases undertakings started with the operation of tramways along the main roads, supported at the next stage by feeder services with motor buses and eventually the replacement of the tramways by motor bus services.

When it is considered that this process of evolution has gone on through a period of fifty or sixty years, it would be surprising indeed if some of the reasons for the original routeing had not changed in degree of importance or, in some cases, had not ceased to exist altogether. Industrial and housing development in our towns has gone on apace through the years, especially in the postwar years, which have seen the establishment of new industries and particularly the building of large housing estates on the outskirts of towns, giving rise to change in the travel habits of the public and a shifting of the population.

It is quite probable that such projects took place in phases and that to meet interim stages of development the new traffic was catered for by extending the nearest available route for a short distance. It may have been expedient to do this at the time—perhaps a bit of excessive layover was used—but further extensions became necessary as time passed. In the early days of the particular development such extensions may have represented only a small fraction of the total length of route and were perhaps only of about half a mile at a time. But once committed to serving the beginning of a housing estate by a certain route, there is sometimes a tendency to continue until, in the final instance, the extensions get a bit out of hand. The result is sometimes that the original concept of a route is lost. Also, many of us have instances of diversions of route which look a bit peculiar when examined today, because they were instituted for reasons which were not always operationally sound.

The Principle of Direct Operation

From time to time I have come across indications of the very considerable potential for economy if some of our more devious routes could be straightened. You will all know of instances in recent years of various schemes introduced to ease the ever-increasing pressure of traffic in the town centre. A fairly recent one I have in mind was a gyratory scheme which added 0.09 of a mile, in one direction only, to the routes which had to traverse it. Owing to the frequency of the services involved, this added 15,000 miles per annum to our operation. This very small diversion serves to illustrate what I want to emphasise—the significance of the weight of frequency behind decimal points of mileage which can add up to something very substantial if you look at the system of routes as a whole.

You might like to examine your own routes, as I did, and note the number of "dogs legs" or deviations from the direct route which you have, and calculate how much they cost in a year. You might also like to examine your routes and see to what degree you are providing services which either overlap, run very close to each other on adjacent roads, or in other ways compete with each other. I think it better and more economical to concentrate on one route with a good frequency rather than two of a poor frequency. While some circular services may be successful, I would say that they can be wasteful because they have been based on the supposition that the frequency required round the whole of the circle is the same, and my experience has been that the greater the diameter of the circle, the less likely is this to be the case.

In these days of stringent economy we might look for a guiding principle to tramway operation. In general terms, tram routes went straight into the heart of a densely populated area via the major artery and came straight out again. One of the advantages of the motor bus over the tramcar was its flexibility, but this very flexibility is open to abuse to a point where it militates against the economic running of the services. I think it would be better if we were left with main trunk services at good frequencies—and I am a great believer in the public appeal of good frequency—to which people might have to walk a little way, rather than dissipate our strength over a number of wandering routes operating at indifferent frequencies which can only mean that the distances which the individual passenger has to travel are greater than necessary, therefore taking longer in time and costing a higher fare because the fares are based on mileage.

Local geography may determine whether services shall radiate from a central hub in the heart of the town or whether they shall be cross-town services, starting at one side of the town, running through the centre, and terminating at an opposite extremity. Short-distance radial services offer to the operator the advantage of making the passenger pay twice to get from one side of the town to the other, and of permitting a frequency which need only suit one section of route. There is, however, the drawback that terminal layover occurs more often than with the cross-town services and they do not stimulate cross-town traffic. A feature of our rerouteing scheme was to provide more cross-town facilities but, in so doing, to link together areas of population as near balanced in density as possible so as to provide a route likely to require a similar frequency throughout its length. A further possibility arising from the reduced running time necessary to operate more direct routes was a reduction in the peak output of buses. This was a key point, for the peak output determines the size of the fleet.

Preliminary Estimation of Potential

All these things, taken together, seemed to offer considerable scope for making money—and for losing it! I thought that a comprehensive rerouteing of services might well provide a way of meeting a substantial deficit, as an alternative to the more orthodox measures of increasing fares or reducing frequencies. The first job was to determine whether the idea contained sufficient potential to provide a weapon big enough to fight the deficit. Clearly no milk-and-water scheme would be big enough. The only thing to do was to work it out in the frame of mind that bold, if unpopular, measures would have to be taken.

I started by merely modifying existing routes but got into practical difficulties because so many of them were either joined together or the one interdependent on the other. I might improve one feature but threw up a worse one at the other side. Finally I took a blank map of the town and plotted new routes as I would have liked to see them had I been starting afresh, although still containing some faults which the great scarcity of suitable roads made inevitable.

The first calculation of mileage showed the new pattern saving 330,000 (12½ per cent) miles per annum compared with the old, notwithstanding the fact that many people would enjoy at least as good a frequency as that to which they were accustomed, and in some cases a better one. Clearly something had to give to produce this result and there were three short sections of route—two of half a mile and one of a quarter of a mile in length, left without any service at all. I had also plotted the routes with the aim of eliminating one route altogether because 80 per cent of its length overlapped others, and this was the largest single contribution to the mileage saving. The different linking of ends meant that compared with the old network there were some through rides which had disappeared but these were offset by some new through rides which were going to offer a new facility. All in all the new network appeared to offer reasonable facilities for passengers. The total potential cash saving was of the order of £24,000 per annum.

Putting it Over

I was instructed to give a full-scale demonstration to the council sitting in general purposes committee. After hearing me, it authorised the transport committee to proceed with the scheme. I went to very considerable trouble to try to get the platform staff with me, because without them I was just wasting my time. I attended Sunday morning meetings to explain the whole scheme to them and to tell them why it was necessary and to tell them what it was hoped to achieve by it. I went by myself with no "bodyguard" of officers to prompt me on any answers I did not know. Not that I pretended for a moment to know all the answers, but I felt there was more psychological advantage to be gained by talking with them as an individual than was likely to be lost by being "caught out" with the odd question. On reflection, I think this paid dividends.

On the question of running times, it was agreed to give them a fair trial, and complain afterwards if necessary. I promised to redress promptly any inadequacy which practice brought to light. I posted for the view of the general public large scale maps in a prominent position in the town centre showing the proposed routes. At the same time I secured the co-operation of the local Press in giving considerable publicity to the proposed new routes with the idea of testing public reaction and trying to draw out, before the event rather than after it, any objections which may be forthcoming.

The result was five petitions, totalling about 1,500 signatures, three of which related to one area, two to another. These petitions were carefully analysed and it was apparent that they were canvassed, rather than representative of a spontaneous outburst of public opinion. Checks on passenger loadings over the particular sections of route did not show the numbers of passengers travelling regularly which the petitions claimed. At the traffic court, the objectors had their say and three modifications were made as a gesture towards meeting them. We put back on one route 0.06 of a mile of diversion from the straight, on another route 0.29 of a

(*Continued on page* 21)

* Abstract of paper read at the annual conference of the Municipal Passenger Transport Association in Douglas on September 13. For those interested a diagram and description of the new routes appeared in MODERN TRANSPORT of December 12, 1959.

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ROAD VEHICLE INDUSTRY

Motor Vehicle Electronics

ELIMINATION of all moving parts is achieved in a completely transistorised system of control for a vehicle a.c. generator set introduced by Simms Motor Units, Limited. The company reports that the equipment has been ordered by London Transport for some of its new RM-type buses. In the new equipment electronic devices are used both for rectification of the a.c. supply and for controlling output. Instead of the rather cumbersome equipment formerly needed for rectification of the output of an a.c. generator, a compact lightweight box of germanium diodes is used. Of still more compact dimensions is the transistorised control board, in which the functions of the long-established vibrating contact form of current and voltage regulator are now more efficiently performed by transistors. A printed circuit is also used as a further space-saving feature. Apart from the space saving which these arrangements provide, complete elimination of the periodic adjustment demanded by electro-mechanical controls is claimed.

Five-Speed Gearbox for B.M.C.

NOW available for all versions of Austin and Morris 702 series 7-ton chassis is a new five-speed constant-mesh gearbox, which is offered as an option to the four-speed unit at an additional cost of £60. It provides forward gear ratios of 7.58, 4.38, 2.39, 1.47 and 1 to 1 forward and a 7.51 to 1 reverse. It can be used in conjunction with either single- or two-speed rear axles.

Chrome Cleaner and Protector

NOW available through garages and motor accessory stockists is a new chrome cleaner and protector introduced by Romac Industries, Limited. Named Formula 51, it is supplied in tubes in paste form and is said to require no hard rubbing quickly to bring up a brilliant finish, lifting off rust and tarnish stains and protecting the metal against further corrosion. Apart from polishing chromium, for which it was primarily developed, it can be used with equally good results on nickel, aluminium, brass, pewter, copper, stove enamel, plastics and paintwork.

Extra Studies for Young Engineers

TWELVE young employees of Leyland Motors, Limited, have been selected to take an advanced course in automobile engineering which the company's educational development adviser, Mr. E. H. Bailey, started this week. The aims of the course are to link up the theoretical knowledge of holders of the Higher National Certificate, Higher National Diploma or Diploma in Technology with the practical problems involved in the design of heavy-duty vehicles and to shorten the time required to gain the practical experience which is necessary for successful design; to find those students who have the aptitude and desire to specialise in unit design; and to enable those with outstanding design ability to show their potentialities for future development. The student gaining first place in the final examination—at Easter—will be offered a travelling scholarship to the United States for three months. Those placed second and third will be offered travelling scholarships for one month to the Continent.

Low-Priced Articulated Dumper

A HEAVY-DUTY articulated dump truck selling at a price some £2,000 less than its nearest equivalent is now being produced by Eimco (Great Britain), Limited, Gateshead. Named Eimco 850, it has an exceptionally strong 9 cu. yd. (25,000-lb. payload) welded body with interior and exterior reinforcement. It has a wide mouth and low lip for easy loading and has a 70-deg. tipping angle. The standard power unit is the Leyland AU 600/35A six-cylinder automotive diesel producing 150 b.h.p. at 2,200 r.p.m. Transmission comprises a 16-in. dryplate clutch and separately mounted five-speed constant-mesh gearbox. Speed varies from 3 m.p.h. in first gear to 24 m.p.h. in top and a gradient ability of 1 in 4 fully loaded is claimed. Standard wheelbase is 13 ft. 9 in. and with steering controlled by four hydraulic rams giving a 180-deg. swing, the turning circle is said to be only 22 ft. 9 in. Overall dimensions are 24 ft. 5½ in. long and 8 ft. 5 in. wide. Normal equipment includes air-pressure brakes and 16.000-25 24-ply rating hard rock lug tyres. The first production vehicle has been in service and in the first few weeks of operation it averaged 60 hr. a week, in one week alone it is said to have been in operation for 99 hr.

Eimco 9 cu. yd. articulated dumper powered by Leyland

Powerful Paint Remover

NEWLY introduced by Allweather Paints, Limited, Pitan Type C paint remover is a non-inflammable stripper claimed to remove any and every type of paint as well as to restore old oxidised paint brushes. Principal feature of the material is that no neutraliser or washing off after use is required, since it leaves a surface ready for painting; as it removes all previous coatings, it is essential that appropriate primers, sealers and knotting be applied before repainting.

Notes on the Vehicle Test

OWNERS of vehicles subject to the Ministry of Transport 10-year-old test will welcome the publication of a new R.A.C. booklet, *Vehicle Testing*. Compiled by R.A.C. engineers, the booklet explains the scope and requirements of the scheme and states clearly what the examiners will look for when testing under the three main categories—brakes, lighting and steering. It also tells how these tests will be conducted. Other aspects such as fees, documentation, repairs, appeals and liability in the event of damage are also covered. *Vehicle Testing* is free to R.A.C. members.

Larger than usual: A Boys-converted Dodge in service with G. D. Allen, Checkley, features 23 ft. 6 in. long body, five-speed gearbox, Eaton 18500 two-speed axle, Leyland O350 diesel engine and Pirelli 377 Tyrex-cord tyres; right, a 30-ton capacity Atkinson of Eccles Transport, Scunthorpe, features Gardner 6LX engine, ZF six-speed gearbox, Kirkstall special double-drive axles, Pilot tipping gear and 28-cu. yd. steel body and Goodyear hard rock lug tyres

Equalising Valve for Dual Tyres

A SIMPLE device designed to equalise the pressures in dual tyres while running, developed by Carlan Instruments Co., Inc., Cranston, Rhode Island, U.S.A., is now available in this country through Walker-Tyseley (Electrical) Limited, a company associated with the Excelsior Motor Co., Limited, Kings Road, Tyseley, Birmingham, 11. The Carlan valve pressure equaliser is self-contained and interconnects the valves of a pair of dual tyres. If one tyre of a pair starts to build up excessive pressure due to unequal loading, air is transferred to the other tyre until pressures are again equal and this action is automatic and constant. If one tyre suffers slow deflation, complete loss of air is prevented by a check valve which can be preset to any desired pressure; similarly, if either of the connecting hoses is severed operation of the Carlan valve ceases without loss of air below the preset level. Two checking points are provided for checking tyre pressures individually. American users have reported increased tyre mileage from 10 to 20 per cent.

A.E.C. in West Africa

AN announcement by A.E.C., Limited, indicates that the Bartholomew group of companies, which has for some years imported A.E.C. vehicles into West Africa, has now been appointed sole distributor for the A.E.C. range in Nigeria, Ghana and Sierra Leone. The Bartholomew group plans to service and hold spares for the entire A.E.C. range through its depots, which are established in every major locality. A.E.C. will have its own factory representative, Mr. G. J. Browning, who will be taking up residence in Nigeria forthwith. In his new position he will be responsible for co-ordinating sales in West Africa in conjunction with the newly appointed distributor.

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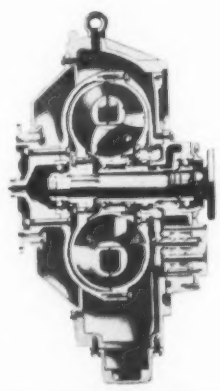
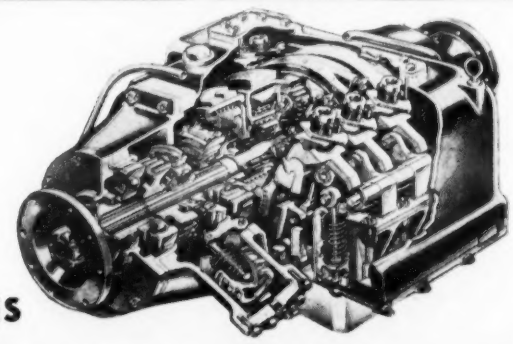
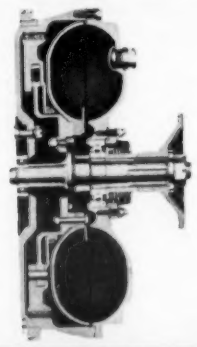


GEARBOXES



FLUID CLUTCHES



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Mercedes-Benz at Earls Court

FOR the first time, Mercedes-Benz commercial vehicles are to be sold in Britain and they will make a first appearance at the Commercial Motor Show next week. The display by Mercedes-Benz (Great Britain), Limited, will comprise three diesel-engined goods vehicles—a front-drive 35-cwt. van and semi-forward- and forward-control versions of the company's popular medium-capacity two-axle chassis for 13 tons gross weight. The two types fit four- and six-cylinder water-cooled diesel engines respectively, featuring Mercedes-Benz patented Uniflow combustion system and Bosch in-line fuel-injection pumps.

The Mercedes-Benz forward-control chassis for 13 tons gross

The four-cylinder engine in the van has a gross output of 46 b.h.p. at 3,500 r.p.m. It drives through a four-speed synchromesh gearbox with steering-column changespeed lever. The engine, transmission and front axle, complete with suspension, brakes and steering, are all mounted on a sub-frame, which is flexibly attached to the chassis frame and detachable for ease of servicing and repair. The van body has interior dimensions of 9 ft. 10 in. from back of seats to rear doors, 6 ft. 1½ in. wide and 5 ft. high. Top speed is said to be about 50 m.p.h. and average fuel consumption about 31 m.p.g.

Exhaust Brake Standard

A feature of both the bigger vehicles is the standard fitting of an exhaust brake. This is manually controlled through a lever on the steering column, which is arranged to release automatically when either the clutch or accelerator are used. The semi-forward-control chassis has an alligator bonnet opening to 90 deg. It has a wheelbase of 13 ft. 9⅜ in. and is fitted with a 15-ft. long tipper body. The six-cylinder diesel engine develops 110 b.h.p. at 3,000 r.p.m. and drives through a five-speed synchromeshed gearbox and air-operated two-speed rear axle, fitted also with an air-operated differential lock for improved traction on soft ground.

Service brakes have air servo-hydraulic operation and the handbrake lever is of the multi-pull ratchet type. Recirculatory-ball steering gear is used, with a 21-in. steering wheel, and standard equipment in the insulated three-man cab includes one-piece curved windscreen, driver's seat with height, reach and rake adjustment, sun visor, heater-demister and flashing direction indicators. Dry weight of the chassis and cab is 3 tons 10¼ cwt. Performance figures given by the manufacturer are top speed of 48 m.p.h., gradient ability of 1 in 2.7 and fuel consumption of about 18½ m.p.g. running at 13 tons gross weight.

The other 13-ton gross vehicle has a similar general specification, but without the differential lock. It has a full forward-control two-seat cab and a wheelbase of 14 ft. 5¼ in. and is fitted with a 20-ft. long dropside lorry body. United Kingdom prices are said to be competitive.

Rerouteing of a Town Bus System

(Continued from page 19)

mile which was like going round the apex of a triangle rather than across the base as I wanted to, and in another case we extended a terminal point 0.18 of a mile. But the 0.06, the 0.29 and the 0.18 of a mile amounted to 20,000 miles per year, and that is the sort of thing I have been trying to convey. Subject to these modifications the application was granted in full.

Launching the Scheme

To implement the scheme entailed much detailed planning and publicity. Separate leaflets were prepared for each service, giving times, fares and a diagram of the route in each case. Supplies of these leaflets were sent to the personnel officers of the principal factories in the district and made available at the public library and all public offices. The whole fleet had to be equipped with new destination screens and many bus stops had to be resited. New bus-stop plates were prepared where necessary and route numbers were attached to all town centre stops—a new feature. The date of the introduction of the scheme was fixed for December 27, 1959, the culmination of ten months of hard work. You could pick a worse time from a traffic point of view, but at least it had the advantage of being a quiet time when many people were on holiday and had more time to find out which of the new services suited them best. Operationally, the whole thing went off satisfactorily.

While the estimate of saving (before the modifications) was of the order of £24,000 per annum, the unknown factor was the effect on revenue, and this, of course, was vital. It was not a question of comparing the new with the old, but of comparing the new with either a general increase in fares or some drastic reduction in frequency on the old routes. It was never just a matter of taking a chance with something unproven as an alternative to something which was sound. We were up against it, and the old order could not continue.

The first month certainly was a very anxious time for me. Because of more direct—and therefore shorter—routes, 12 fares had been reduced by 1d., and you cannot expect to withdraw 300,000 miles without losing some revenue. Those miles must have been earning something, even though they were operated at a loss. The receipts improved as the weeks went by and for the first full quarter showed a 2 per cent drop on the corresponding period last year. Considering that for the first nine months of the financial year the drop had been 4 per cent, I do not think this is too bad. It may have been that the receipts would have improved anyway, we shall never know, but at least it looks as though the results from the income standpoint were not unreasonable; I put it no higher than that. On the expenditure side, it looks as though the savings expected after modification for the concessions made on the original scheme, will substantially accrue. The best assessment I can make is a net gain out of the whole business of some £20,000 per annum.

Since first writing this paper, we have had a general revision of fares to meet the recent wage award and the rerouteing scheme has had further effect in this. Most of the fares reduced are still not as high on the new scale as they were on the old scale on the old routes and, because of the more direct nature of the new routes, many of the new fares are not as high as they otherwise would have been. This is of benefit to the department because our general standard of fares is more reasonable than it would have been, a factor which must reflect in the degree of passenger resistance about which we have been so apprehensive. Had we in 1959 adopted the alternative of increasing fares, we would today have the disastrous position of a general increase in fares in three successive years, 1958, 1959 and 1960. Apart from saving us one general increase in fares, the scheme has given us a more flexible network of routes.

World Air Transport

(Continued from page 9)

of new aircraft will bring available capacity to an unprecedented peak, it will become increasingly important to attract new traffic and develop new markets. And the best way to do this will be to lower international fares still more. How in present circumstances can this be done? There are, I think, three alternative possibilities.

The Hard Way

The first as an economic theory would be to cut back on profit. In the present state of the industry, this could not bring the average airline ticket down by more than a couple of cents. The profit just isn't there, and that course is not open to us. The second way would be to seek government subsidy. If anyone cared to do it, a case might perhaps be made for subsidising air transport as a means of boosting a nation's net economic gain through tourism. But I know of no government which is likely to look on such an argument with favour; and I am certain that all airlines would rather stand on their own feet. The third alternative is to reduce the cost of providing air service. This is the hard way, but it is the only way which holds real promise.

In the past, we have been able to make substantial cuts through processes such as watching every penny, increasing operational efficiency and by squeezing our passengers; reducing unit costs by getting more passengers into each aircraft, as in tourist and economy classes. But given the size and configuration of both the human animal and the aircraft fuselage, I doubt whether we can go much further, at least on many routes, except insofar as higher speeds mean that people do not have to sit still for so long.

I have expressed the view in past years that the industry has not paid enough attention to air cargo. I inflict the statement on you again because it is still true and because it is more important than ever to say it. Cargo at the moment represents about 18 per cent of the scheduled tonne-kilometres performed by the world's airlines. In terms of revenue, however, its contribution to airline earnings is probably much closer to 10 per cent.

The fact that cargo carryings increased 16 per cent in 1959 over the previous year is in itself mildly encouraging. But the increase in the cargo capacity available—in the holds of the new jets, in the rest of the existing fleet and in the aircraft newly put into all-cargo service—far exceeded 16 per cent. From that point of view, actual performance is not very satisfactory at all. There is certainly a need to consider now what action is required to ensure that cargo traffic follows the same orderly and intelligent pattern we have tried to achieve in passenger traffic.

Whether we like it or not, the supersonic aircraft is a prospect we must face within the next decade. Airlines should take the initiative in trying to define the kind of supersonic aircraft which will fit their own needs. I can imagine no unhappier issue than the production of a supersonic aircraft which the airlines cannot operate with any hope of economic success and which will therefore be an economic disaster for the manufacturers. I cannot forbear to hope that the supersonic aircraft will mean cheaper transport, rather than merely faster transport. And I hope as well that no one will be panicked into producing or accepting a supersonic before we have had a chance to digest the jets and equip ourselves for the even more demanding transition ahead.

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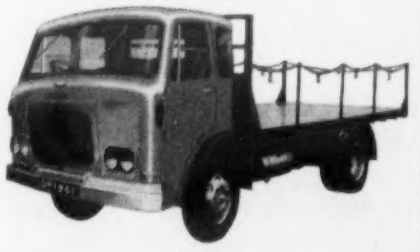

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BRITISH RAILWAYS

SHORT SEA CRUISES

*2—Cargo Liners and Specialised Facilities**

SHORT VOYAGES ON LARGE LINERS

ALTHOUGH not so numerous as in the years prior to 1939 some of the regular cargo liners operating from British ports still convey a certain number of passengers; in fact several owners, notably in the German and Scandinavian trade, make a special feature of such sailings but it is advisable to make early application for berths for travel during the high summer season. An interesting feature of these services is that single passengers are also conveyed, so when planning a maritime tour they are useful additional facilities to those provided by the cross-channel services.

Dealing briefly with the regular sailings:

Argo Line. This German shipping company of Bremen works regular services from Hull and Leith serving Bremen and Hamburg employing vessels with modern passenger accommodation. Twice weekly sailings operate from Hull all the year with a passage time of about 36 hours Hull—Bremen or Hamburg—Hull but a round trip of eight to nine days is available at a fare range of £10 10s. single to £26 round voyage. The Leith sailings are run during the summer months a slightly longer time and higher fare being applicable. Approximately 50 passengers are carried on these ships. The general agents in England for the owners—Argo Reederei, Richard Adler and Söhne, Bremen—are John Good and Sons, Limited, Ibex House, Minories, London, E.C.3.

Associated Humber Lines. The group of services from Hull and Goole operated by Associated Humber Lines, Limited (Goole Steam Shipping), form part of the railway cross-channel network but in addition special round-voyage fares (inclusive of meals) are available. The new motor vessels *Bolton Abbey* and *Melrose Abbey* have accommodation for 80 first-class passengers in various types of berth for the thrice weekly Hull and Rotterdam service at fares ranging from £6 10s. to £8 single to £13 to £16 return. The m.v. *Byland Abbey* and m.v. *Kirkham Abbey* operate a weekly Goole and Copenhagen run at fares of £14 single, £28 return and £32 round voyage of nine to ten days. To Germany, departing Goole—Bremen—Hamburg returning Hull and/or Goole, the motor vessels *Whitby Abbey* and *Fountains Abbey* work three sailings per fortnight, fares being £10 per berth single and £19 return, with a supplementary charge for passengers wishing to stay on board in Germany or proceed from Bremen to Hamburg. Considerable reductions for out-of-season travel are offered on all the above sailings.

Bergen Line. Synonymous with Norway are the names of s.s. *Leda* and m.v. *Venus* operated by Bergen Steamship Company from Newcastle upon Tyne to Stavanger, Haugesund and Bergen. Linked with these regular sailings are the famous tours arranged by the shipping company in conjunction with many hotels, and other providers of transport in Norway. Probably the most outstanding of these is the Norwegian Coastal Voyage to the North Cape leaving Bergen daily and taking 12 days for the return trip. A similar service runs from Bergen to Oslo or vice versa enabling an interesting tour to be carried out from Newcastle upon Tyne in conjunction with Fred Olsen Line. Minimum fares to Bergen exclusive of meals are £9 tourist class, £14 10s. first class, but there are many special tour rates. Luxury cruises are also run with *Meteor*.

Coast Lines Limited. Calling at the ports of Cork and Dublin in the Republic of Ireland this company continues to maintain its round-trip arrangements between London and Liverpool on which the motor vessels *Caledonian Coast, Hibernian Coast, Ocean Coast* and *Pacific Coast* are employed. Passenger accommodation is situated amidships and comprises single and double cabins, with dining-room and lounge. Single fares are from £18 10s. to £21 and the round voyage of about 10 or 11 days £40 to £45 according to berths. The 1960 season runs to the end of September.

Fred Olsen Line. The Newcastle upon Tyne, Kristiansand and Oslo service is run by Fred Olsen and Company with the motor vessels *Blenheim* and *Braemar* and a large range of inclusive tours on similar lines to those via Bergen is arranged by the shipping company. Fares on the United Kingdom run are inclusive of meals in this case and vary from £9 to £14 each way according to class of accommodation. Connections are available with the Oslo to Bergen coastal steamer services.

Wilson Line. The holiday voyages provided by Ellerman's Wilson Line, Limited, to Scandinavia are varied but unfortunately accommodation is limited and is usually allocated after registration by prospective passengers. The Wilson Line fleet of modern vessels afford ideal amenities generally for 12 passengers only with accommodation in comfortably furnished outside staterooms. The passenger office of the Wilson Line is at Queen's House, 10 Chapel Street, Hull, and there are agencies in principal cities. Between United Kingdom and Scandinavia the 1960 programme covers the following sailings:

Sailings from Hull and London every Friday evening to Oslo and by-ports affording facilities for passengers to make the round voyage of approximately nine to ten days' duration. On the outward journey vessels normally proceed direct to Oslo, the sea passage being about 40-44 hours. Vessels usually stay two days in Oslo before proceeding to one or more of the following ports in the Oslo Fjord: Skien, Porsgrunn, Horten, Drammen, Moss, Sarpsborg, Fredrikstad, Halden and Kristiansand and are scheduled to leave the last port of call Friday evening. Sailings from Hull Saturday fortnightly to the west coast of Norway, calling at Stavanger, Bergen and Trondheim. The round voyage is approximately of 10 to 11 days' duration. Specimen fares from Hull to West Norway are from £16 to £18 single, £32 to £36 return and £48 to £53 round voyage with cheaper rates during the winter period (October 10, 1960, to April 8, 1961).

There are sailings from Hull every Friday evening direct to Göteborg the sea passage being about 38-40 hours. The vessel remains at Göteborg until the following Friday evening and the round voyage is approximately nine to ten days' duration. There are sailings Friday fortnightly from Hull to South Swedish ports of Malmö, Helsingborg and Halmstad. The duration of the round voyage is approximately nine to ten days, the stay of the vessel at these ports being determined by cargo requirements. Sailings are made from Hull and London Thursdays fortnightly to Stockholm and East Swedish ports, the round voyage being approximately 18 to 20 days' duration. Calls are usually made at Norrköping, Stockholm, and in addition one or more of the following, dependent upon cargo requirements: Gefle, Sundsvall, Oskarshamn and Kalmar. Specimen fares to Malmö from Hull during the summer months—April 11 to October 9, 1960, are £16 to £18 single, £32 to £36 return and £42 to £47 round voyage.

From Hull Friday fortnightly by the s.s. *Borodino*, with accommodation for 37 passengers, service is provided to Copenhagen; the sea passage is approximately 45-50 hours, and the vessel is normally scheduled to remain in Copenhagen for about three days prior to proceeding to the Danish provincial ports of Odense and Aarhus. The vessel usually sails from Aarhus on Friday evening returning direct to Hull and the round voyage lasts approximately from nine to ten days. From London Friday fortnightly by a vessel with accommodation for 12 passengers only offers another route. Services to Denmark are run in conjunction with Det Forenede Dampskibs-Selskab A/S, which has sailings from both Hull and London to Copenhagen on the alternate Fridays. Round voyage facilities are not available by these vessels but a limited number of passengers may be booked for the single and return passages. Specimen fares to Copenhagen are £19 to £25 single, £37 to £47 return and £48 to £60 round voyage, summer rates; the winter charge is considerably cheaper. The cabin accommodation offered has a wide range. On all the above sailings children's fares are available at half rate.

Other services. The United Steamship Company also provides passenger facilities on some of its cargo services such as those from Grimsby to Esbjerg and from Scottish east coast ports and the Gibson Rankine Line offers accommodation on certain vessels to Belgium and Holland. From ports around Merseyside, too, there are limited facilities to Belgium and Holland by British and Continental Steamship Co., Limited, sailings and to Sweden by Svea-Coker Line.

Special Short Sea Cruises

Within the last few years a new facility for the enjoyment of a short cruise has been developed by the British Transport Commission. Originally the s.s. *Falaise* was so employed but since 1959 the new t.s.s. *Duke of Lancaster* has also been operating, while this year the two vessels have been joined in their work by the s.s. *Normannia*.

Due to the need for these vessels to be employed on their normal routes during high summer, their cruise work is confined to the spring and early summer period with one late summer cruise. The programme for 1960 included four by *Falaise*, two to Rouen and two to the Channel Islands and St. Malo, two by *Normannia* of which one was from Dover to Antwerp and Ostend and the other from Dover to Amsterdam, and four by *Duke of Lancaster*. This vessel made one Scottish lochs cruise from Heysham in May and commences another on September 17, while in June it sailed twice from Southampton, once for Ostend, Amsterdam and Rouen, and once for Antwerp, Esbjerg and Amsterdam.

All these cruises allow time ashore for sightseeing and a wide variety of tours is available from ports of call to such places as Copenhagen and inland cities such as Brussels and Paris for those who wish to combine a road journey with their voyage. Cruise fares include all meals during the cruise with slight variations according to sailing time and arrival at British ports. Shore excursions are, of course, additional, usually being paid for by cruise passengers out of their foreign currency allowance. Charges range from £10 10s. to £28 3s. on the *Falaise* from Southampton or on the *Normannia* from Dover. On *Duke of Lancaster* the figures are £25 to £45 or £37 to £65 for the six-day and ten-day cruises from Southampton. Scottish Loch sailings are from £37 to £65. All ships are first class only.

In Scottish waters too, three unique cruises were arranged by the National Trust for Scotland for May, 1960, leaving at weekly intervals and visiting castles, gardens and islands otherwise difficult of access, each itinerary being carefully planned, charges from Ardrossan being from approximately £60. The luxury cruising vessel *Meteor* of the Bergen Line was used for these voyages which included such places as Dunvegan, Fair Isle and St. Kilda.

Day Excursions

The old-established day excursion afloat is still available around the British coastline although on a diminished scale in certain areas. On the other hand day trips to the Continent have tended to increase in the last few years with relaxation of passport regulations to allow for this type of traffic and this series of articles has dealt in some detail with the facilities offered by the General Steam Navigation Co., Limited. These were operating during 1960 on similar lines as in 1959 with sailings from Gravesend, Southend-on-Sea, Margate, Ramsgate and Deal to Calais and Boulogne with additional sailings from Clacton to Calais. Various joint rail and steamer bookings were available.

British Railways also has a number of excursion facilities for day visits to the Continent in connection with regular cross-channel sailings supplemented by special sailings. These serve Ostend (with through bookings to Brussels), Calais, Boulogne, Dieppe (with through bookings to Paris), Havre and St. Malo. Fares vary according to the rail journey involved but typical examples from London are Ostend 71s. for second class rail and first class steamer, Boulogne 60s. second class throughout, Paris 91s. second class throughout.

Atlantic Liners and Luxury Cruises

For those who wish to enjoy the atmosphere of an Atlantic liner there is a number of opportunities to travel aboard these ships at moderate passage rates between various North European ports and Southampton. United Kingdom offices or agencies of Cunard Line, Europe/Canada Line, Hamburg American Line, Hamburg Atlantic Line, Holland America Line, Home Lines, and United States Lines should be consulted as to sailings and charges. Typical examples are £10 tourist class, £16 first class between Bremerhaven and Southampton by s.s. *Bremen* of North German Lloyd and £9 13s. tourist class or £14 6s. first class between Hamburg or Cuxhaven and Southampton by s.s. *Homeric* of Home Lines; this vessel calls also at Flushing or Zeebrugge. An interesting tour can be arranged by the incorporation in the itinerary of Holland America Line sailings calling at Cobh or Galway, Republic of Ireland and another facility is offered to Cobh by Cunard ships.

The luxury cruises to the Norwegian fjords by *Meteor* of the Bergen Steamship Company are a famous feature of the tourist trade and the present vessel bearing the name has been designed for her particular purpose. In June, July and August, 1960, seven cruises were scheduled to operate, the first cruise commencing from Leith and the last, the final cruise, which visited the Baltic as far as Leningrad, terminated at Harwich. For the 13-day cruises to Spitzbergen charges from the United Kingdom ranged from £135 to £300 according to type of accommodation. With the exception of the first cruise the ship operated from Bergen and passengers travelled from Newcastle upon Tyne by the regular service. During March, April and September other cruises have been worked by this vessel to the Mediterranean, Greek Islands and Black Sea.

Stella Polaris is another name associated with Scandinavian cruising and the modern motor vessel of this name operated by Clipper Line, for whom D. H. Drakeford Limited, 60 Haymarket, London, S.W.1, is U.K. agent, had a 1960 programme of five cruises sailing from Boulogne and calling at either Dover or Harwich. Various itineraries extending to North Cape and Stockholm were arranged at charges varying between £100 and £445 according to length of voyage and accommodation. A September cruise to the Mediterranean is also scheduled. Other 1960 luxury cruises have been run to Scandinavia by Home Lines with a sailing by s.s. *Homeric* from Southampton and Havre in September and by Royal Mail Lines from Southampton in July on the r.m.s. *Andes*, a 20-day cruise costing from £100 to £420.

Other Cruise Connections

Many of the steamship lines mentioned have routes operating from their home ports and by using these to other terminal ports of services to and from British ports it is possible to work out a whole series of independent travel tours of from three to four days upwards. Some of the principal services set out in a clockwise direction for quick reference with the list of regular cross-channel services are: Bergen to Oslo, Rotterdam, Antwerp; Oslo to Bergen, Copenhagen; Copenhagen to Oslo, Hamburg; Hamburg to Copenhagen; Amsterdam to Bergen, Stavanger; Rotterdam to Bergen, Haugesund, Stavanger; and Antwerp to Bergen.

Extensions from Continental main ports are also another means of enjoying an extended holiday afloat and it is possible to arrange through bookings and tours from the United Kingdom, notably the Gota Canal in Sweden, in conjunction with Swedish Lloyd Line, and the Rhine, for which there is a whole group of cruise arrangements with sailings from Rotterdam arranged by Comelders Travel, European Yacht Cruises Limited, Yacht Holidays Limited and Köln—Düsseldorfer Rheindampfschiffart which has now commissioned its new luxury cabin cruiser m.s. *Europa* (MODERN TRANSPORT, August 6).

* No. 1 appeared August 27.

SOCIAL AND PERSONAL

Minister to Visit South America

THE Minister of State at the Board of Trade, Mr. Frederick Erroll, together with Mrs. Erroll, will visit Colombia, Ecuador, Peru, Chile, Argentina, Uruguay and Brazil between October 14 and November 17. The Minister will see as much as he can of the contribution already made by the United Kingdom firms to economic development in South America and he will discuss the further opportunities for increasing trade with these countries, whose commercial links with the United Kingdom are of long standing.

* * *

Mr. R. H. Thornicroft has been appointed deputy manager of the traffic department of A.E.I. (Rugby) Limited.

* * *

Mr. E. H. Kinselle, T.D., who has been appointed head of freight development section, at York, North Eastern Region, B.R., joined the London and North Western Railway at Watford in 1917 and was trained in the goods, traffic and coaching departments in London, North Wales and the North of England. Later he held positions in the chief goods manager's office at Euston; Aldersgate Street in the City of London, and the district commercial manager's office, Derby. As a territorial officer he served at various command headquarters in the United Kingdom during the 1939-45 war, also overseas with the 8th Army in Italy and later in the Middle East, attaining the rank of lieut.-colonel. Returning to the railway service in 1947, Mr. Kinselle held appointments at Derby, Nottingham, Bradford, Glasgow and Dundee. In 1952 he was appointed to the district commercial manager's office, Dundee, as head of the canvassing and development section, and in 1956 became chief commercial representative at Leeds. In 1958 he became deputy head of the freight development section at York traffic headquarters, the post he now vacates.

Mr. E. H. Kinselle

* * *

We are glad to learn that Mr. Alban Ford, press officer of the British Omnibus Companies' Public Relations Committee, is making a good recovery from his recent serious illness.

* * *

Mr. E. E. Cooper, formerly works manager, Commer Cars, Limited, has been appointed general manager of British Light Steel Pressings Limited, at Acton, a Rootes Group company.

* * *

The Minister of Transport has appointed Alderman E. Corrigan to be a member of the Transport Users' Consultative Committee for the North Eastern Area as a representative of labour.

* * *

We record with regret the death of Mr. D. W. Brisbane, chairman of B.P. Refinery (Kwinana), Limited, and a director of the Midland Railway Co. of Western Australia, Limited. He was 72. The Midland is the only large company-owned railway in Australia.

* * *

We record with regret the death, after a short illness, of Mr. U. F. M. Dellaert at the age of 67. He had retired recently from the managing directorship of the Schiphol Airport Authority and had been a main driving force in the rehabilitation of the airport after its wartime devastation.

* * *

Mr. J. B. Duncan, C.A., has been appointed an additional director of Transport Development Group, Limited. He entered the service of the Group in 1953. He became group accountant in 1955 and was appointed a manager of the company in 1959 with particular responsibilities in the fields of administration and new acquisitions.

* * *

Mr. F. L. Jagger, hitherto assistant (salaried staff) to the regional establishment and staff officer, London Midland Region, B.R., has been appointed assistant regional establishment and staff officer, Eastern Region, Liverpool Street, in succession to Mr. A. L. Crewe, who has retired. Mr. Jagger began his railway career on the former L.N.E.R. at Leeds in 1924. He became assistant (salaried staff) in 1955.

* * *

Mr. E. R. Quesada, administrator of the United States Federal Aviation Agency, accompanied by five F.A.A. senior officials, was in London last week for discussions with the Ministry of Aviation, including a review of the progress made in Anglo-American co-operation in research and development in the air navigation services field, and discussions on the development of supersonic transport aircraft, noise abatement in the vicinity of airports, and common problems in respect of regulations and their enforcement.

Mr. S. J. Barnes, at present director and general manager of the Clayton Dewandre Co., Limited, has been appointed managing director of the company.

* * *

Lieut.-Cmdr. R. B. Lakin, D.S.O., D.S.C., has been appointed a director of Vickers-Armstrongs (Engineers), Limited, and general manager of its North East works.

* * *

Mr. H. Wogden, formerly plant superintendent of the Toronto factory of Dunlop Canada, Limited, has been appointed general works manager of the India Tyre and Rubber Co., Limited, at Inchinnan.

* * *

Mr. H. W. Reynolds, A.M.Inst.T., assistant to district goods superintendent (Sales), Leeds, North Eastern Region, B.R., has been appointed assistant district commercial superintendent (sales), Middlesbrough.

* * *

Blackhawk, Limited, importer and manufacturer of a wide range of hydraulic equipment and accessories, with special application to the automotive and transport industries, has appointed Mr. K. E. Tomline its general manager in charge of sales. Mr. Tomline took up his new appointment with effect from September 1.

* * *

The Tilling Group announces that Mr. I. Campbell, B.Sc., A.M.I.Mech.E., who is at present chief engineer of the Thames Valley Traction Co., Limited, has been appointed, with effect from January 1, 1961, chief engineer of United Automobile Services Limited and its associated company, Durham District Services, Limited. Mr. Campbell started his career in 1937 on the engineering side of road transport as a student apprentice in the Northern General Transport Co., Limited. After Army service he joined the Eastern Counties Omnibus Co., Limited, and in 1950 was appointed assistant engineer to Thames Valley Traction, becoming chief engineer in 1956.

* * *

As announced in our last issue, Mr. R. Watson Lee, formerly director and general manager of Rootes Motors (Parts), Limited, has joined the board of Commer Cars, Limited, and Karrier Motors, Limited, and became general manager upon Mr. Cozen's recent retirement. Mr. Watson Lee joined the Rootes group as a special trainee in 1946, on his demobilisation from the Army with the rank of lieut.-colonel after a distinguished war career. Following a thorough grounding in all departments of the organisation—including two years as a goods vehicle sales representative—he served as personal assistant to Mr. Geoffrey Rootes, managing director of the manufacturing division of the group, before being appointed group parts manager in 1954. Two years later he became director and general manager of the newly formed parts company and helped to create the £10 million central parts depot which was opened in Birmingham last year.

Mr. R. Watson Lee

* * *

We regret to record the death of Mr. P. J. Lewis, divisional traffic officer, Western Division, British Road Services. He was 60. Mr. Lewis entered the transport industry as manager of a Cardiff haulage business and in 1928 he formed and was managing partner of Lansdowne Motors in the same city. He was appointed district manager, Newport-Cardiff district, British Road Services, upon nationalisation in 1948, and became divisional traffic officer for the Western Division in 1952. He was a former South Wales area chairman of the Road Haulage Association, and during the period 1939-43 acted as group organiser for the Ministry of War Transport. He had an active part in the setting up of the Port Emergency Road Transport Pool for the South Wales area and was subsequently chairman of the Cardiff sub-area and of the South Wales area of the Emergency Road Transport Scheme set up by the Minister of Transport in 1946.

Three Willowbrook-bodied A.E.C. Reliances for one-man operation with front entrances and central exits have been delivered to London Transport, which has typed them RW. Seating 42 passengers they will operate on the 322 group of services between Watford and Hemel Hempstead (see page 4)

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IMPORTANT CONTRACTS

Double-Deckers in Demand

IN the few weeks preceding the Commercial Motor Show, Leyland Motors, Limited, has contracted to supply £400,000 worth of double-deck buses to municipal and private bus undertakings in Britain. The largest order has been placed by Manchester Corporation for 40 Titan PD237 double-deckers with synchromesh gearboxes and air brakes. Huddersfield Corporation, which has been running various makes of buses for many years, has now turned to Leyland for a new fleet of 18 Titan PD32 double-deckers with air brakes and semi-automatic transmission. Repeat orders for the rear-engined Atlantean double-decker have been received from Western Welsh Omnibus Co., Limited, for another 16, from Wallasey Corporation for another 10; another order for one has been placed by Silver Star Motor Services, Limited, Salisbury. Other orders for Titans include 10 for Chesterfield Corporation, seven for Preston Corporation, five for Exeter Corporation and three for West Hartlepool Corporation.

Widening M1 Hard Shoulders

John Laing and Son, Limited, has started work on the reconstruction and widening from 8 ft. to 10 ft. of the grass hard shoulders of the M1 motorway north of Luton.

More M.A.N. Railcars For Ceylon

Ceylon Government Railway has ordered a further five heavy diesel-mechanical railcars from the Nürnburg works of M.A.N. This follows successful operation of 25 similar vehicles, employing a large M.A.N. diesel engine driving all four axles through Mekydro transmission, supplied on an earlier contract, in Colombo suburban services.

More Perkins Engines to Germany

An order totalling nearly £150,000 for four-cylinder Four 203 diesel engines for use in German-built fork-lift trucks has been placed with Perkins Engines, Limited, Peterborough. The engines have been ordered by Ruhr Intrans Hubstapler G.m.b.H., Mulheim, and will be fitted in licence-built Clarklift 2½- and 3½-ton fork-lifts. Perkins Engines announced a £35,000 order for similar engines in May this year.

New Cranes for Grangemouth Docks

A total of 22 electric cranes has been ordered by British Transport Docks for Grange Dock, Grangemouth. Contracts have been awarded to Stothert and Pitt, Limited, for 16 6-3-ton and two 10-3-ton cranes and to Cowans Sheldon and Co., Limited, for four 7½-4-ton units capable of dealing with general traffic or discharging bulk dry cargo by grab. The new appliances are part of the major scheme announced earlier this year for the modernisation of the Tongue berths and the South Quay at Grange Dock.

Rolls-Royce Power for Swedish Locomotives

In competition with American and Continental engine manufacturers, Rolls-Royce, Limited, has been given an order for diesel engines and torque converters to power 50 new shunting locomotives to be built for Swedish State Railways by Kalmar Verkstads Ab. The engines will be Rolls-Royce C8TFL turbocharged eight-cylinder units and the torque converters will be similar to those built by Rolls-Royce for shunting locomotives elsewhere, except that they will incorporate a freewheel to allow locomotive coasting. Controls will be arranged so as to facilitate multiple working of locomotives.

Eastern Region Contracts

The Eastern Region of British Railways announces the following contracts:

W. and C. French, Limited, Wisbech, for reconstruction of sheet piling at the ends of underline bridge between Branston Goods and Saxilby.

James Scott and Co. (Electrical Engineers), Ltd., London, S.W.1, for electrical installations at Hertford East and Bishops Stortford.

Joseph Westwood and Co., Limited, London, E.14, for reconstruction of superstructure of bridge over High Street, between Saxmundham and Darsham.

Thomas Fletcher and Co., Ltd., Mansfield, for forming an embankment, construction of two subways and strengthening of five arches of Rectory Road Viaduct, between Hackney Downs and Rectory Road, and remedial measures in connection with slip in embankment at bridge between Barkston and Hougham.

Eagre Construction Co., Limited, Scunthorpe, for new drainage and a sand blanket and the trimming of the cutting slopes between Newark and Retford.

Jersey Airlines Buys Heralds

Six Handley Page Dart Herald turboprop air liners have been ordered by Jersey Airlines for operation on its scheduled routes from the Channel Islands. Deliveries are planned to commence next June. In announcing the signing of the contract, Mr. M. L. Thomas, chairman and managing director of Jersey Airlines, said that his company had closely evaluated all turboprop aircraft in the short-haul class, but that none showed such a high profit potential as the Herald over his company's short-stage lengths, which average only 100 nautical miles. The Heralds ordered are a 48- to 50-seat version, incorporating a 42-in. fuselage extension, with a take-off weight of 39,000 lb.

North Eastern Region Contracts

Recent contracts placed by the North Eastern Region of British Railways include the following:

Drummond Asquith, Limited, Birmingham, for a carriage washing machine at Hammerton Street motive power depot, Bradford.

Holman Bros., Limited, Sheffield, 2, for tractor-mounted air compressors and accessories.

Matisa Equipment, Limited, Chertsey, for rail saws and drills.

Hymatic Engineering Co., Limited, Redditch, for Hydrovane mobile compressors.

Dow-Mac (Products), Limited, Stamford, for precast concrete units for bridge at Cod Beck, on the York—Newcastle line.

Pavior Construction, Limited, Shipley, for the raising of the superstructure of a bridge near Hampole on the Doncaster—Leeds line.

Cleveland Bridge and Engineering Co., Limited, Darlington, for reconstruction of bridge near Lucker on the Newcastle—Berwick line.

Tarslag, Limited, Stockton-on-Tees, for precast concrete units for reconstruction of bridge near Lucker on the Newcastle—Berwick line.

A.E.C. Marshal Popular

The A.E.C. Marshal six-wheeler appears likely to prove popular among construction site operators for its ability legally to carry a 6-cu. yd. cement mixer filled to capacity within the 20-ton gross limit. Contracts for 12 chassis have been placed by Ransomes and Rapier, Limited, which ordered two Marshals earlier this year to conduct experiments with the new chassis. Winget, Limited, has also ordered ten chassis and will be exhibiting a completed mixer vehicle at the Public Works and Municipal Services Exhibition at Olympia in November. Since its introduction, the Marshal has been modified to enable a hydraulic pump to be mounted and driven from the front of the crankshaft, to supply power for hydraulically driven mixers.

SHIPPING and SHIPBUILDING

Cunard Cargo Liner

TRIALS of the new *Alaunia*, the second of two fast cargo-liners built for the Cunard Line's North Atlantic services, were to take place this week. The new Cunarder is to sail from London for Montreal, via Havre, on her maiden voyage, on September 26. Following her maiden voyage she will enter the newly extended Cunard cargo service between the United Kingdom and American ports on the Gulf of Mexico. Her first voyage in the Gulf service will begin from Glasgow on November 3 and from Liverpool on November 11. Built by William Hamilton and Co., Limited, of Port Glasgow, the *Alaunia* was launched in May. She has a gross tonnage of 7,000, a total cargo deadweight of 7,500 tons, and her service speed is 17 knots. She has a cargo capacity of 550,000 cu. ft., plus 25,000 cu. ft. of refrigerated space. She is fitted with portable steel divisions for grain-carrying, and has four tanks, with a total capacity of 475 tons, for the carriage of edible oil. Like her sister, *Andania*, which entered service in May, she has been designed to negotiate the Manchester Ship Canal. For this she is equipped with telescopic topmasts, a hinged radar mast, and a removable funnel top. Crew accommodation, which is contained in the midship deckhouse, is completely air-conditioned.

U.K.—Australia Rates

THERE would be no reduction of passenger fares or cargo rates by shipping lines operating between Australia and the United Kingdom, Sir Leighton Seager, former president of the Chamber of Shipping of the U.K., predicted in an interview in Sydney. He said: "The outlook is gloomy, particularly for British shipping. There are just too many ships in the world to carry the amount of cargo available." It was assumed that he was referring to tramp cargoes.

Wallasey Ferry Issue

THIS week a special meeting of Wallasey Town Council was convened to discuss a proposal by the Passenger Transport Committee to raise boat and bus fares, and abolish concessionary combined bus and boat contracts, on ferry services across the Mersey. The proposals are opposed by the Labour group, which tabled 16 amendments. It says that no changes should be made in the fares structure until the council has fully considered a report on the ferry undertaking made by a firm of business consultants earlier this year. Last week Labour aldermen and councillors and other party workers were on duty at Seacombe Ferry as peak-period crowds passed through for Liverpool. They distributed leaflets inviting passengers to sign a detachable slip protesting against the proposed increases. The slips were collected as the passengers returned to Wallasey later in the day.

Atlantic Containers

MANUFACTURERS or shippers interested in using the United Kingdom—United States road-sea container service operated by Davies, Turner and Co., Limited, in conjunction with North American Van Lines, Inc. (see note on page 1), can deliver to the Davis, Turner depots and warehouses in London, Glasgow, Liverpool and Southampton; alternatively, a container will be delivered to a firm and subsequently collected for transport to the docks. This can be on a deliver one day and collect the next basis and manufacturers can also collect containers from the company's depots, load and then deliver to docks; part cargoes are accepted in some cases. The containers —which at the moment come in five different sizes —are of steel construction; they are weatherproof and reasonably thiefproof and are manufactured with lifting irons which enable them to be handled by fork-lift trucks. At present British dock-workers have shown no signs of making things difficult in the handling of the containers, and this service could well be the forerunner of others, which together could result in the provision of those long-awaited all-container ships on the North Atlantic run.

A lubrication chart for the Bedford CA series of 10-12 and 15-cwt. vans is now available from Castrol. Copies can be obtained from the Castrol Chart Library, Castrol House, Marylebone Road, London, N.W.1.

MANCHESTER—CREWE ELECTRIFICATION

(*Continued from page* 16)

layouts at the approaches have been remodelled and the station frontages and passenger amenities modernised.

The electric traction system is to take 50-cycle single-phase alternating current direct from the National Grid by arrangement with the Central Electricity Generating Board. The contact wire is supplied at 25,000 volts and the voltage is reduced and the current rectified (by mercury arc on the locomotives and by germanium rectifiers on the multiple-unit trains) before passing to the traction motors. The transmission advantages of alternating current with the absence of substations, are are thus combined with the benefits of the operating characteristics of direct-current traction motors.

Engineering Work

The task of the chief mechanical and electrical engineer involved organising and supervising the contractors who undertook the erection of the overhead equipment needed for the electrified lines. Concrete foundations were provided for the overhead masts to carry the high-voltage electric cables and some 4,000 foundations were constructed and 5,500 masts and stuctures have been erected. Ground augers carried on railway wagons were used to bore the mast holes; concreting, cable laying and wiring were carried out from special trains and a special articulated elevating platform was employed to erect the cantilevers which suspend the catenary wires.

Altogether 12 track section cabins and feeder stations have been provided and a new control room constructed at Crewe. Once the installation was completed numerous tests were carried out to ensure dependability. Main-line locomotives and suburban multiple-unit stock have been running for some time and have been used for training drivers and train crews. To work the main-line services, 20 new a.c. locomotives have been provided, each of 3,300 h.p. and capable of running at 100 m.p.h. The multiple-unit sets, built at Wolverton, are of four coaches each.

(*To be continued*)

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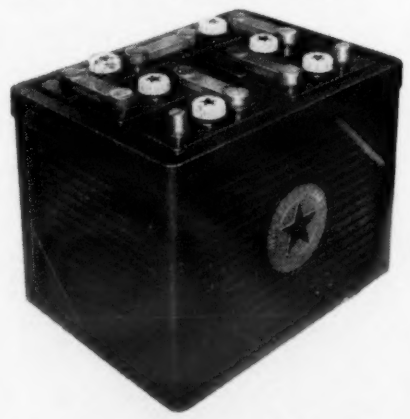

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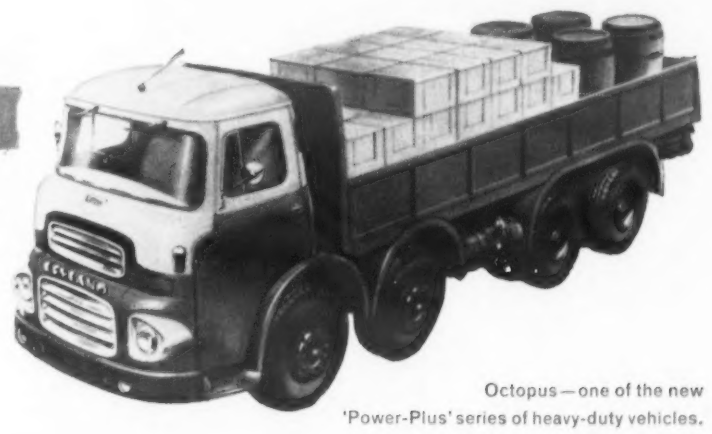

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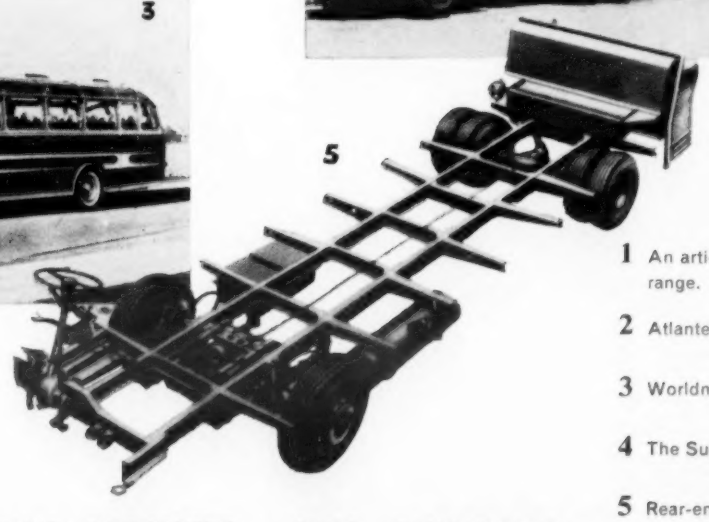

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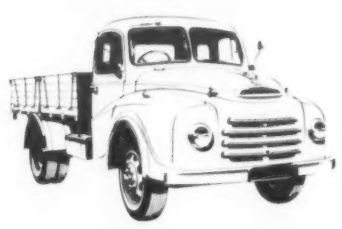

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